

Messages from Modern Inventors to the Next Generation

10. “One-Seg”, “ISDB-T” / *Technologies for Digital Terrestrial Television Broadcasting* - Mr. Takeshi Kimura, Senior Research Engineer, Broadcasting Networks Division, Science and Technology Research Laboratories, NHK



Now, there are occurring big changes in the television service and industry.

Analog TV service will fully switchover to DTTB (digital terrestrial television broadcasting) by July 24, 2011. The DTTB enables home TV viewers to receive super clear Hi-vision services. Also, One-Seg service allows the viewers to watch television on a mobile terminal at any time and any place.

Inventions by Mr. Kimura and his coworker have made it possible to provide Hi-vision service for homes and One-Seg service for mobile terminals simultaneously with a single radio wave.

What inspired you to become an inventor/researcher?

My interest in radio started developing when I was in elementary school. I used to play with things around by converting and decomposing them and even by creating new things out of decomposed stuff. I also got interested in music while going up to the junior high school, high school and university. Then, I became more sensitive about the sound quality. I found it tough to solve problems of distortion and noise of music discs and broadcasting channels. Although I cannot remember whether I wanted to solve

these problems as a professional, I somehow joined NHK (Japan Broadcasting Corporation). I started my career by working in the broadcasting studio for the first three years and then moved to STRL (Science and Technology Research Laboratories). By that time, I had been determined that I would study broadcasting systems.

During my junior high school days, I read a description of NTSC system (National Television Standards Committee, the analog color television broadcasting system) in the encyclopedia. I was so moved by the dexterous system where color signals are inconspicuously embedded and black and white TV sets were still able to be used that I used to read it repeatedly. I guess that this boyhood encounter influenced my choice of career and approach to my research.

What specific ideas and difficulties have you faced as an inventor/researcher?

On analog television, there is a state that only TV sound can be heard while TV picture is not seen. There is also a small terminal with which only TV sound can be heard. This fact motivated us a developing team to consider that such a function should also be adopted to a new digital television system; which initiated our research and study.

ISDB-T (Integrated Services Digital Broadcasting for Terrestrial) the DTTB system in Japan is a system where radio waves are assembled by 'segment' blocks. A television wave consists of 13 segments. Each segment can be set up in the way the strength against interference is selected. And, this enabled some segments to be stronger against interference than other segments. We tried to simplify receiving equipment which converts received radio waves to digital signals.

Another innovation is seen in one of our ideas that makes the one segment out of 13 to be seen consistent. This realizes "One-Seg". Reception of only one segment has enabled us to invent that small One-Seg mobile phone receiver which you are familiar with.

There was a difficulty other than technical ones. In the workplace we had difficulty in concentrating on our creative ideas while simultaneously having to deal with various duties. Accordingly, we the development team intensively worked on the development, by confining ourselves in a place with no outside connections. I now recall those rough but the best possible way of work against our difficulties.

What gives you joy as an inventor/researcher?

There are various joys and pleasures to be found in research of the broadcasting system. One feels pleasure after the hardship of getting a system proposal into shape. One feels joy after the difficult time in having the system finally accepted as the Japanese standard. And, the goal of joy is reached when the system is finally made a practical reality to be used by many people. Particular pleasure is found in the field of broadcasting where the system is used more widely and for a longer period of time than in any other fields.

The ISDB-T system was successfully established not only by the work of us the inventors, but also by the cooperation and understanding of many people in the NHK as well as in other broadcasters, manufacturers, public offices and related organizations. Having users kindly understood, the system has begun to spread nationwide. Our joys and pleasures are just in the fact that the system has been accepted by you all. Thank you!

I would be even more grateful if the technology of the ISDB-T system could further be introduced in books or through other media so that more people became interested in studying the broadcasting system.



Photo (left): Early experimental “One-Seg” receiver



Photo(right): Experiment using the receiver

What message would you like to give to the next generation?

There are a variety of types of inventions. The first popular one is an invention that

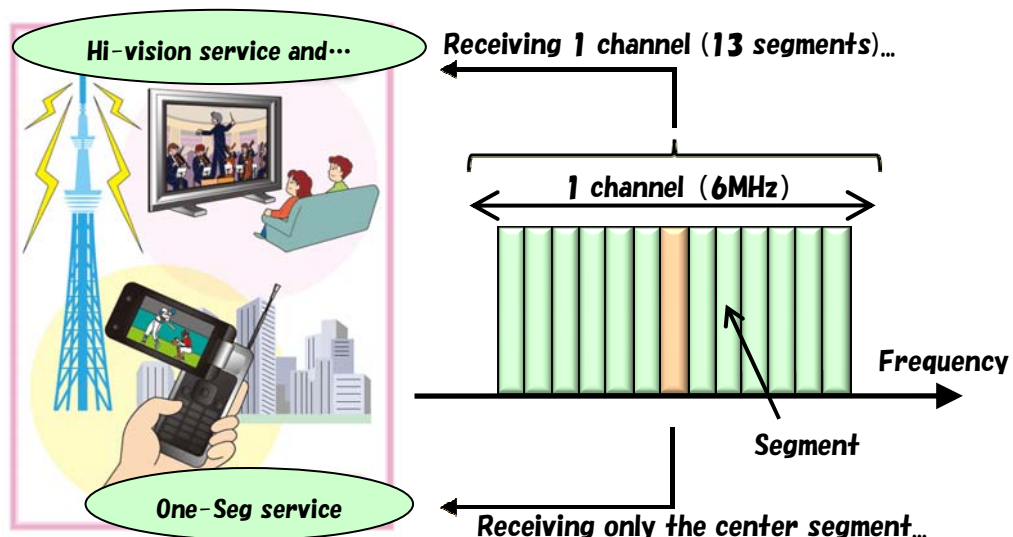
comes from “perspiration”.

The second one is an invention that comes from “inspiration”. One day at a meeting, hearing a name of proposal “non-block system”, I imagined a certain technology on my own and thought that I was “beaten by such a skillful system”. In fact, however, it was unlike the technology I came up with. So, I hurriedly got my ideas in shape to file a patent application. This is an invention that came from “inspiration” - inspired by a name.

The third one is an invention that comes from “laziness”. One wishes to create things easily and without fail. One therefore devises a plan so that things can be simple. The invention of the ISDB-T system might have been created out of a plan of “laziness” with which one wished “to realize a convenient function with simplified hardware”.

No matter what type of invention is being pursued, successful results will come from daily research and continuous development.

In the digital era, one may achieve by force whatever one wishes. This however may not bring happy satisfaction. A plan should be fully worked out so that a “brilliant” and “skilful” invention is created. This is what YOU the next generation inventers will be expected - I believe.



Drawing: ISDB-T system