

Standardization of Emergency Warning Broadcast System in Central and South America

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1. Introduction

Japan's digital terrestrial broadcasting standard (ISDB-T) has been adopted widely in Central and South America and implementations are advancing in each of the countries there. Currently, the system has been adopted in 15 countries around the world, including Botswana in Africa (Figure 1). The authors of this article were sent as JICA experts to support the implementations of digital terrestrial broadcasting in Peru, Chile, and Costa Rica.

An important feature of ISDB-T is the Emergency Warning Broadcast System (EWBS) which uses an emergency warning signal, sent by the broadcaster when a tsunami or other emergency warning has been issued, to automatically turn on receivers that are in standby mode, and then broadcasts the warning. Its objective is to help prevent or mitigate damage caused by such disasters.

The countries which have adopted ISDB-T have high expectations for this system and so we have made great efforts to promote the international standardization of EWBS, and at the ISDB-T International Forum at the end of May 2013, we reached a final agreement on a common standard among the countries adopting ISDB-T. Our activities are described below.

2. Expectations for EWBS in Central and South America

The Central and South American countries stretching from Central America along the Pacific Ocean side of South America, such as Peru and Chile, experience frequent earthquakes. However, an effective means of conveying emergency warnings to the general public has not been developed. Mobile telephone networks have expanded to a certain size, but there are still many issues to be addressed before mobile communications can be

considered a "universal service" guaranteeing access to information at any time and any place during emergency. For example, if users fall behind with their payments for services, they often face being disconnected without any advance warning.

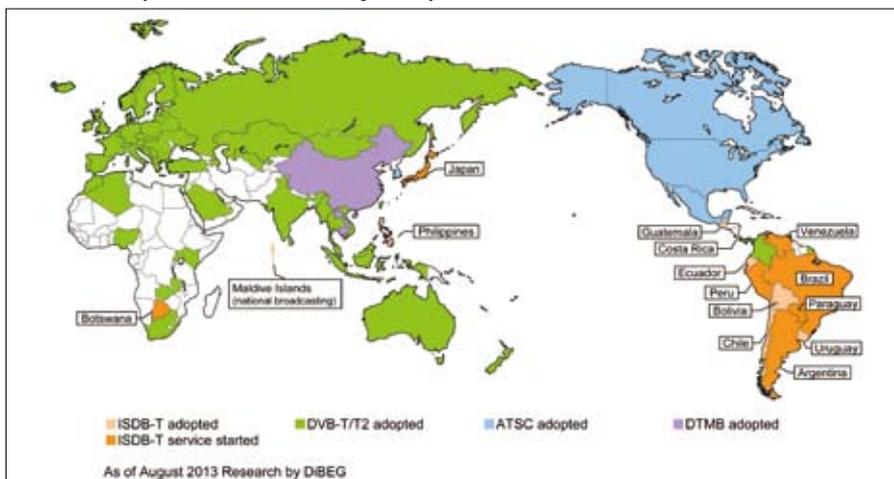
Meanwhile, terrestrial broadcasting networks are robust against damage from earthquakes and other natural disasters because they use radio waves, and congestion does not occur even though it uses simultaneous access. ISDB-T also features One-Seg broadcasting, which can be received by mobile terminals that are not affected by outages in fixed power sources and can provide stable reception in the severe conditions immediately following a disaster. In addition to the EWBS function, ISDB-T can also provide detailed disaster-related information needed in disaster-hit areas through Data Broadcasts, related to services such as water, roads, electricity, gas, and public transportation. Thus, ISDB-T is an extremely effective means of delivering information to the general public in times of disaster, and is suitable as a "universal service." These facts were demonstrated in the recent Great East Japan Earthquake in March 2011.

Many of the countries decided to adopt ISDB-T were conscious of the superiority of EWBS. These countries had very high expectations for the transfer of related technology and know-how from Japan.

3. Technical harmonization activities at ISDB-T International Forum

A very important aspect of planning the implementation of ISDB-T in Central and South America was ensuring the compatibility of receivers in the region by adopting common technical standards and operational rules. This helps lower the cost

■ Figure 1: Digital terrestrial broadcasting standards around the world (As of the end of May 2013)



■ Figure 2: History of hosting the ISDB-T International Forum

- 2009.09 1st, Lima, Peru
- 2010.05 2nd, Buenos Aires, Argentina
- 2010.08 3rd, Sao Paulo, Brazil
- 2011.03 4th, Santiago, Chile
- 2012.03 5th, Quito, Ecuador
- 2013.05 6th Montevideo, Uruguay



of receivers and it also has benefits for users of the services.

In order to maintain harmonization in the implementation processes among the countries adopting ISDB-T, the “ISDB-T International Forum” was organized and it has been holding meetings periodically. Currently, there are 13 countries participating: Argentina, Bolivia, Botswana, Brazil, Costa Rica, Chile, Ecuador, Paraguay, the Philippines, Peru, Uruguay, Venezuela and Japan. (Figure 2)

A technical harmonization working group (WG) was created as a sub-meeting, working to align technical specifications and operational guidelines so that common receivers could be used. Within this technical harmonization WG, further three working groups were created called “Hardware (overall receiver),” “Middleware (Data Broadcasting),” and “EWBS.” The authors all worked as coordinators or vice coordinators in the EWBS working group. (Figure 3)

Brazil decided to adopt ISDB-T early in 2006, and is most advanced in implementation. The “Japan-Brazil standard” (ISDB-Tb) is based on the original Japanese specifications and integrates the latest technologies such as MPEG4. It was developed and standardized in Brazil and has become the standard in Central and South America. Generally, other countries in the area have been content to adopt the Brazilian specification as it is.

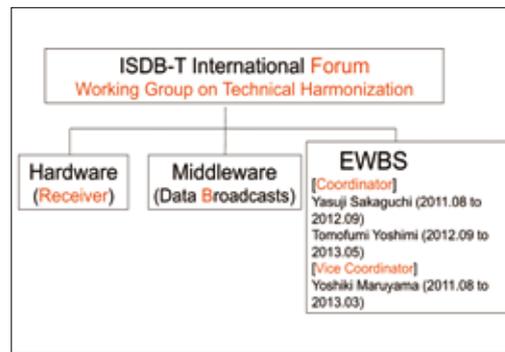
The Hardware and Middleware working groups has been proceeding under the support of Brazil, but the situation regarding EWBS is different. Brazil has few earthquakes or other natural disasters and so it has relatively little interest in EWBS, and standardization within Brazil has not been progressing. On the other hand, countries on the Pacific Ocean side of the continent such as Chile and Peru, and also Costa Rica in Central America, have more earthquakes and they are very interested in EWBS. As such, they have high expectations for help from Japan which is the only country operating the EWBS and we took the positions of coordinator and vice-coordinator. (Table 1)

4. New Specifications for EWBS in Central and South America

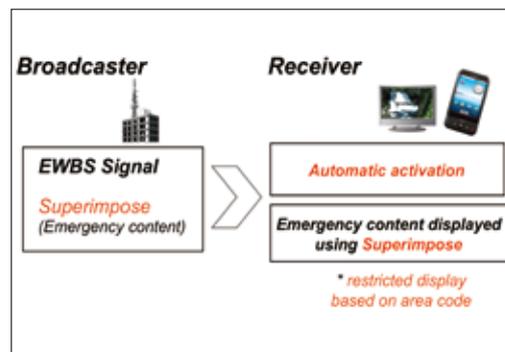
(1) Use of “Superimpose” closed caption function

The EWBS for Central and South America introduces a Superimpose closed caption function. Superimpose sends text information, separately and independently of the main video or audio program with messages that are generated and displayed on the television screen by the receiver. An advantage of Superimpose is that messages are simple text and so any kind of emergency information can be displayed flexibly, such as “Heavy rain and flooding advisory for the AAA district,” or “Earthquake in the BBB district. Tsunami warning.”

■ Figure 3: Study organization for the Technical Harmonization WG



■ Figure 4: Operation sequence for EWBS in Central and South America



■ Table 1: History of EWBS international standardization activities

2009.09	Assignment of Mr. Sakaguchi to work in Peru
2010.03	Assignment of Mr. Maruyama to work in Chile
2011.03	Presentation on EWBS by Japan at Chile Forum
2011.04	Development of new EWBS specification adding “Superimpose” closed caption function
2011.08	New specification announced at Brazil meeting Establishment of EWBS Working Group Appointment of Mr. Sakaguchi as coordinator and Mr Maruyama as vice-coordinator
2012.03	Agreement on initial version at Ecuador Forum
2012.03	Assignment of Mr. Yoshimi to work in Costa Rica
2012.08	Region code operational guidelines decided at Brazil meeting Coordinator changed (from Mr. Sakaguchi to Mr. Yoshimi)
2012.09	Return of Mr. Sakaguchi to Japan
2013.03	Return of Mr. Maruyama to Japan
2013.05	Reaching of Final agreement at Uruguay Forum

(2) Use of area code restricted display function

With the EWBS, receivers are pre-configured with an area code and so the transmission of emergency warnings can be restricted to only desired regions. This was a very strong advantage for Central and South America, because local programs are often not available in all areas of a country. In the larger countries in particular, such as Brazil, Argentina and Peru, networks often use satellites to broadcast to remote, mountainous or jungle areas, and so only the programming from a central broadcasting station is available in those places.

Superimpose is transmitted via satellites to the terrestrial networks in all areas of a country and the display of emergency warnings in targeted areas is determined by the area codes in receivers. This feature makes the system even better suited to the broadcasting networks in Central and South America. (Figure 4)

5. Conclusion

When Japan was promoting the ISDB-T standard around the world, many countries showed a strong interest in the EWBS. In response to this interest, Japan has provided extensive support to bring together a complete, common international standard on the international stage.

To really expand the adoption of the EWBS in Central and South America in the future we hope that all of the countries involved will make efforts while Japan will need to provide continuous support using its high level of know-how in the field.

Finally, we would like to express our great appreciation to all those from all of the countries in the ISDB-T International Forum contributing to these efforts, as well as to the Japanese contributors in DiBEG and to the other parties involved, for their support in the standardization of the EWBS specifications.