Supporting the Introduction of ISDB-T Terrestrial Digital TV Broadcasting in Ecuador

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1. Introduction

In March 2010, the South American country of Ecuador adopted ISDB-T as its standard system for terrestrial digital TV broadcasting, and in September 2012 it began gradually promoting efforts to transition to digital broadcasting, including the establishment of a master plan for the terrestrial digital migration. From November 2012, I spent three years living in Ecuador as a JICA specialist advisor to support the introduction of terrestrial digital broadcasting. This article introduces the work I did during this period.

2. Terrestrial digital implementation system

When I first arrived in Ecuador, there were four government agencies handling the migration to terrestrial digital broadcasting: MINTEL, SUPERTEL, CONATEL and SENATEL.

I was assigned to MINTEL, where I gave advice on the terrestrial digital migration policy, provided technical assistance to other agencies, broadcasters and equipment suppliers, and participated in discussions of important policies relating to the terrestrial digital migration (including technical standards for terrestrial digital technology and receiver equipment) at a terrestrial digital technology committee comprising the abovementioned groups. There were multiple organizations in charge of the terrestrial digital migration, and it seemed to take a long time for them to reach agreement. However, in February 2015, SUPERTEL, CONATEL and SENATEL were merged to form ARCOTEL (Telecommunications Regulatory Oversight Agency).

Photo 1: The MINTEL offices

3. Drawing up technical regulations

The first step to take when starting terrestrial digital broadcasting is to draw up technical regulations that will form the basis of licensing arrangements. When I first arrived, a draft set of technical regulations had already been produced, and following discussions at the terrestrial digital technology committee, the regulations were more or less complete by the middle of 2013. However, a communication law that came into force in June 2013 introduced the following rules, making it necessary to study how to incorporate the additional provisions into the technical standard. It was decided that channels would be reserved for community broadcasting (which did not yet exist), even though the channel allocations were already saturated at that time.

Following discussions by the terrestrial digital technology committee, it was stipulated in the technical regulations that a single physical channel would be shared by multiple programs.

> **Article 106: Partitioning frequencies fairly**
> The frequencies used for television broadcasting shall be allocated fairly at a rate of 33% to public broadcasting, 33% to private broadcasting, and 34% to community broadcasting.
> (omitted text)
> This fair partitioning of frequencies is to be carried out when migrating to digital television

The technical regulations were published in September 2015, and the licensing examination standards are currently under discussion. The terrestrial digital technology committee was also attended by representatives of receiver equipment manufacturers, and drew up technical standards for receiver equipment and held discussions on issues such as how to equip receivers with functions such as EWBS (emergency warning broadcast system) and data broadcasts.

4. Studying the channel plan

In the major cities of Ecuador, the airwaves are crowded with 20 or more analog TV stations.

As a result, there are only 28 channels available for digital broadcasting (UHF channels 21–36 and 38–49), and it is only possible for a subset of channels to enjoy simultaneous broadcasting during the digital transition period. Four additional channels (14, 15, 50 and 51) will become available later on, but not in time for the termination of analog broadcasting. It was therefore proposed that, in addition to simultaneous broadcasting, channels that had been used for analog broadcasting would be switched overnight to digital broadcasting, with one physical channel being shared for the broadcast of multiple programs. It was initially assumed that channel sharing would be performed temporarily during the transition to digital broadcasting, but as mentioned above, this would also continue after the termination of analog broadcasting.

Photo 2: Making radio field strength measurements with a mobile rig

When forming a channel plan, it is essential that the simulation results are verified by performing actual measure-

ments in the broadcast area. I proposed to MINTEL that a mobile rig should be used to perform radio field strength measurements. In August and September 2014, these measurements were performed in the cities of Quito and Guayaquil, and it was confirmed that the radio waves were propagating as expected.

5. Supporting the maintenance of terrestrial digital facilities

When I first arrived, the state-owned broadcaster Ecuador TV had only been performing test broadcasts from transmitter equipment introduced by the Ministry of Internal Affairs and Communications as part of the Ubiquitous Alliance Project, but in November 2015, terrestrial digital broadcasting was started on 32 channels. I visited each broadcasting station to offer technical advice as preparations for terrestrial digital broadcasting were being made. In June 2013, when multiple commercial stations started their broadcasts, it was found that some of the broadcast stations were not recognized when scanning channels. I investigated this issue, and found that work on digital broadcasting facilities was being performed with an analog mindset, and that various IDs (signals identifying each broadcast that are uniquely allocated to each broadcaster) had not been set. I therefore reported back to MINTEL with ideas on how these IDs could be set and a proposed allocation method.

Also, when exchanging opinions with broadcast station representatives, I found that all the commercial TV stations had outsourced their technical business to external contractors. Although these external contractors were developing digital broadcasting facilities for the first time, they were experienced in analog broadcasting and were able to acquire a deep understanding of technical matters. After that, no issues arose in the construction of facilities.

Photo 3: Providing technical assistance at a transmitter station

Like Japan, Ecuador is a seismically active country that borders the Pacific Ocean, and it has a high level of disaster prevention awareness with respect to natural disasters such as earthquakes, tsunamis and volcanic eruptions. One of the features of the ISDB-T terrestrial digital system is the EWBS (emergency warning broadcast system). Related organizations asked for assistance with regard to the use of EWBS, and I helped them by establishing regional codes, setting up demonstrations, creating introductory specification documents and so on.

6. Promoting the spread of terrestrial digital broadcasting

While broadcasting stations are making progress in the installation of equipment, the transition to digital broadcasting will not advance unless progress is made with informing the public about terrestrial digital broadcasting and promoting the availability of digital TV sets. In Japan, a wide range of measures were employed to raise awareness in parallel with the installation of equipment by broadcasters. When I first arrived in Ecuador, the general public were almost entirely unaware that there would be a transition to terrestrial digital broadcasting, and even the MINTEL representative did not know the extent to which digital-ready sets had penetrated into the consumer TV market. I therefore stressed the importance of public relations to MINTEL, who began airing public information spots on the terrestrial digital migration from April 2013. In June 2014, the soccer World Cup in Brazil was attended by representatives from Ecuador, who saw this as a great opportunity to promote the migration to terrestrial digital broadcasting. Public viewings were held at ten venues in four cities where terrestrial digital broadcasting was starting. At these viewings, many people were able to watch soccer matches on large screens receiving terrestrial digital broadcasts, and in the half time interval, they were shown PR videos promoting the benefits of digital migration, how to receive terrestrial digital TV, and the schedule for terminating analog broadcasts.

Photo 4: Public viewing of a World Cup soccer match

7. Supporting activities in other parts of Latin America

At the request of the Ministry of Internal Affairs and Communications, I took part in the Joint Working Group meetings in Bolivia in August 2015, and in Nicaragua the following November, where I delivered a lecture on the current state and technical challenges of terrestrial digital broadcasting in Ecuador.

8. Conclusion

Oil accounts for about 60% of Ecuador's exports and about 30% of its revenue, and until the second half of 2014, it had a buoyant economy due to the high price of crude oil. Against this background, the country made significant investments in public works such as new airports and road maintenance, and was also making good progress in the transition to terrestrial digital television. However, the subsequent decline in the price of crude oil led to a freeze on public investment, and as of November 2015, licensing based on technical regulations was also on hold pending approval of the examination criteria. It will also be difficult to go ahead with the master plan where analog broadcasting will be terminated in 2018, and although I have advised a review of the master plan's feasibility, this did not take place before I returned to Japan. However, it may be possible to start broadcasting for short periods by setting up preparatory systems to ensure that the technical contractors are fully conversant with digital broadcasting, and — on the hardware side — by reserving space for the necessary equipment at transmitter facilities.

Finally, I would like to thank everyone who supported me during my three-year stay in Ecuador, including the Ministry of Internal Affairs and Communications, the Japanese Embassy in Ecuador, the JICA, the Digital Broadcast Experts Group (DiBEG) of the Association of Radio Industries and Businesses (ARIB), the manufacturers of transmitter equipment, and Ecuador's broadcasters.