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Special Feature

Global Promotion of ISDB-T

Japan's Efforts to Promote ISDB-T Globally/ Technical Assistance with the Introduction of Terrestrial Digital Television in Costa Rica/ Technical Support for ISDB-T in Uruguay/ ISDB-T Activities in Peru/ Supporting the Introduction of ISDB-T Terrestrial Digital TV Broadcasting in Ecuador

Policy

Regarding Japan's Declaration to be the World's Most Advanced IT Nation

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About the ITU-AJ

The ITU Association of Japan (ITU-AJ) was founded on September 1, 1971, to coordinate Japanese activities in the telecommunication and broadcasting sectors with international activities. Today, the principle activities of the ITU-AJ are to cooperate in various activities of international organizations such as the ITU and to disseminate information about them. The Association also aims to help developing countries by supporting technical assistance, as well as by taking part in general international cooperation, mainly through the Asia-Pacific Telecommunity (APT), so as to contribute to the advance of the telecommunications and broadcasting throughout the world.

Japan's Efforts to Promote ISDB-T Globally

Tetsuhiro ENDO
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In 2006, the ISDB-T terrestrial digital broadcasting system was adopted in Brazil. This was the first time ISDB-T (based on the Japanese system) was adopted by another country, so this year marks the tenth anniversary of our efforts to promote Japan's ISDB-T terrestrial digital broadcasting system around the world.

I am delighted that this anniversary is being marked by a special feature on the international deployment of ISDB-T. In the following pages, you will find reports from JICA experts who were dispatched to various other countries. First though I would like to present an overview of the international deployment of Japan's ISDB-T terrestrial digital broadcasting system from a Japanese perspective.

The adoption of this system by Brazil started with the proposal of the Japan's terrestrial digital broadcasting system in the form of a response to a request from the Brazilian government in 1999. The Japanese system performed well in verification trials and the like, and we lobbied for its adoption. This led to signing of an agreement, "Memorandum between the Government of Japan and the Federative of Republic of Brazil on the implementation of Brazilian system of Digital TV based on the ISDB-T standard and the cooperation for the development of the related electronic industry" (items of cooperation between Japan and Brazil in the event of Japan's system being adopted by the Brazilian government) in April 2006. The terms for implementing this agreement were agreed upon the following June, whereupon it was officially announced that Brazil would be adopting Japan's terrestrial digital broadcasting system.

Once this system had been adopted by Brazil, we received requests for lectures and information from other South American countries (Chile, Argentina, Venezuela, Ecuador, Columbia, Peru, etc.). A Japan–Brazil joint mission was then deployed to other countries that were considering the introduction of terrestrial digital TV, resulting in stronger ties with Brazil and greater interest in the Japanese system around South America.

Meanwhile, Asian countries have also been showing greater interest in Japan's ISDB-T terrestrial digital broadcasting system, and while we were making the transition to the phase of supporting the introduction of ISDB-T across South America, we also engaged in activities to promote the spread of this system to other countries in Asia and Africa where there was a possibility of it being selected.

These lobbying efforts were made with the full cooperation of not only the Ministry of Internal Affairs and Communications but also ARIB/DiBEG (the Association of Radio Industries and Businesses/Digital Broadcast Experts Group). ARIB/DiBEG is an organization established in 1997 as a component of ARIB (the Association of Radio Industries and Businesses) with the aim of contributing to the development of digital broadcasting in various other countries through measures such as overseas evangelism, coordination with related Japanese organizations, and collecting information in order to promote the international spread of Japan's terrestrial digital broadcasting technology. Its members include broadcasters, communication providers, and transmitter/receiver equipment manufacturers.

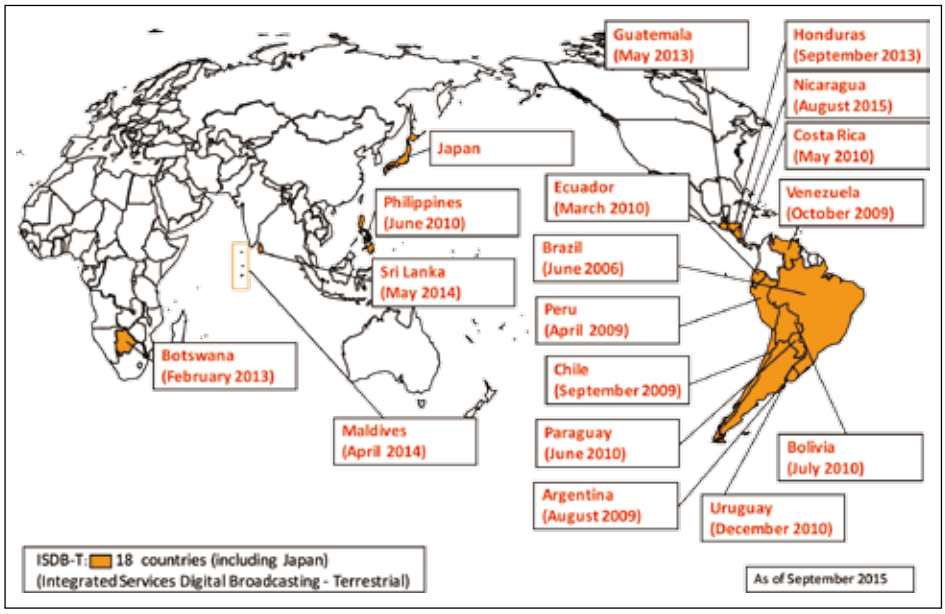
We implemented a highly targeted round of lobbying from a specialist viewpoint that included holding seminars and demonstrations in countries where the introduction of terrestrial digital broadcasting system is being considered and responding to the demands placed on computational resources and data provision.

As a result, there are now 18 countries where Japan's ISDB-T terrestrial digital broadcasting system is being adopted (see figure below).

Once a terrestrial digital broadcasting system has been adopted, there are still many jobs and issues that have to be addressed in order to achieve a successful transition, such as drawing up a master plan for the introduction of terrestrial digital broadcasting, building an organizational structure, procuring the necessary equipment, drawing up a channel plan, drawing up technical standards, and promotional awareness-raising efforts. Since these all require advanced know-how and accumulated experience, in order to promote the introduction of terrestrial digital broadcasting technology promptly, smoothly and reliably in each country, Japan has been continuously running a program whereby specialists are dispatched to other countries (both on short-term and long-term assignments), while trainees from other countries are admitted to Japan. Part of the reason why other countries are adopting the Japanese system is because we offer this kind of support, and our finely-tuned support is highly rated by these countries.

There are eleven specialists (long-term), who have so far been dispatched to places such as South America and Asia. The trainees admitted to Japan received training in subjects such as digital broadcasting technology and theory, the process of Japan's switch-over to terrestrial digital broadcasting, policies relating to terrestrial digital broadcasting, and methods for making use of terrestrial digital broadcasting. This training is based on a curriculum that is updated every year to keep up with policies as the digital switch-over proceeds, and has so far included lectures and practical experience from many engineers and policy-makers.

Figure: Countries that have resolved to adopt ISDB-T



Also, to promote the transfer of knowledge and experience in terrestrial digital broadcasting, for people involved with terrestrial digital broadcasting technology such as government officials, broadcasters (state-owned and private), and manufacturers of transmitter/receiver equipment, we are repeatedly offering these people and ordinary citizens the chance to attend seminars (e.g., to commemorate the start or anniversary of broadcasting, the arrival/departure of experts, or the arrival of dignitaries in order to raise awareness of the spread of terrestrial digital broadcasting technology).

In these seminars, ARIB/DiBEG dispatches a person with specialist knowledge as part of its international outreach efforts, or may actively cooperate with terrestrial digital equipment exhibitions, demonstrations or the like as part of its awareness-raising efforts.

To harmonize the terrestrial digital broadcasting technology and promote a shared experience in countries that have adopted the Japan's terrestrial digital broadcasting system, the ISDB-T International Forum was established in 2009 from members comprising government officials, broadcasters, and manufacturers (countries that are considering the adoption of ISDB-T may also take part as observers). Based on the broadcasting standards of the Japan's terrestrial digital broadcasting system, this forum is drawing up technology harmonization documents that define items where harmonization is required and where integration is needed between countries that have adopted the Japanese system.

So far, the forum has convened seven times. At the 7th meeting held in Brazil (Brasília) from 30th November to 1st December last year, there were discussions on new drafts of technical harmonization documents relating to middleware, and amendments to the technical harmonization documents relating to hardware and EWBS (Emergency Warning Broadcast System). Japanese participants include not only the Ministry of Internal Affairs and Communications, but also ARIB/DiBEG and JICA experts who led the discussions as core participants. As a result, the abovementioned technical harmonization documents were agreed upon, and as of February (at the time of writing) they are currently undergoing approval at each participating country.

To accomplish a successful transition to terrestrial digital television, it may also be worth promoting the following sorts of cooperation besides the above cooperation in order to commence terrestrial digital broadcasting. One is cooperation with the analogue switch off. Today, most of the countries that adopted the Japanese system have started terrestrial digital broadcasting (or have started test broadcasting), and have advanced into the general support phase. After that, the next major target of each country is the common goal of achieving a problem-free ASO (analog switch off). We have introduced and shared the experiences and methods used so far to achieve ASO in Japan. As a result, the ASO in Brazil started in February in the pilot city of Rio Verde. In the future, we will continue to promote the sharing of experiences and methods based on the ASO in Japan. We hope to promote the ASO in each country in this way.

Also, the EWBS is a key feature of the Japan's terrestrial digital broadcasting system, and we are very interested in countries like the Philippines and Central and South American countries that — like Japan — are significantly affected by earthquakes and hurricanes. There are many countries where this was cited as the reason for choosing the Japan's terrestrial digital broadcasting system. In January, a full-fledged EWBS went into operation in Peru. We hope to collaborate with this country to establish a set of best practices that can be used to help with the introduction and promotion of EWBS in other countries.

Last, but not least, the international deployment of Japan's terrestrial digital broadcasting system that started with Japan's proposal to Brazil subsequently led to Brazil becoming a powerful partner of Japan and to the expansion of this partnership to other South American countries that are now becoming leaders in the region alongside Brazil.

For example, in the wake of the abovementioned full-fledged launch of EWBS in Peru, a trend appeared whereby Peru's neighboring countries (Ecuador and Chile) that also had an interest in EWBS sought closer ties with Peru. This sort of trend is promoted by the international deployment of Japan's terrestrial digital broadcasting system, and is expected to result in countries becoming leaders in other regions as well.

Recently, the cooperative international relationships that have sprung from cooperation in terrestrial digital broadcasting technology have led to stronger relations regarding the use of not only terrestrial digital broadcasting technology, but of all ICT sectors centered on this core. The Ministry of Internal Affairs and Communications will continue to work towards strengthening the relationships of all parties. Thank you for your continued support.

Technical Assistance with the Introduction of Terrestrial Digital Television in Costa Rica

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Engineering Administration Department
Japan Broadcasting Corporation (NHK)

1. Introduction

The Republic of Costa Rica is a country in Central America with a population of 4.5 million and a land area equivalent to the islands of Shikoku and Kyushu combined. Its capital city is San José and, like Japan, it is a demilitarized country with no armed forces. 97% of Costa Rican households have televisions, and the country has about 40 terrestrial television stations. Between March 2012 and September 2014, I was dispatched to Costa Rica as a JICA specialist to assist with the introduction of the ISDB-T terrestrial digital broadcast system that was developed in Japan. This article describes what I got up to during my two-and-a-half year stay in Costa Rica.

Photo 1: Visiting the Irazú transmitter station

2. Assigned organization and purpose of visit

Discussions on the introduction of digital television in Costa Rica started when it was listed as one of the public policy objectives in the country's National Communication Development Plan for 2009–2014. This was followed by comparative tests of the three broadcast systems recommended by ITU-R at the time (ISDB-T, DVB and ATSC), and in May 2010 ISDB-T was officially selected. I was appointed to the project about two years later in March 2012. By this time, preparations for starting the process of migration to digital television were already under way. I was assigned to the Ministry of Science, Technology and Telecommunications (MICITT), where I was provided with an office as a base for my work. In my capacity as a support advisor on the transition to terrestrial digital television broadcasting, my aim was to provide technical support for a smooth transition to digital broadcasting by supporting the policy-related aspects of this initiative.

Photo 2: My office at the MICITT in San José

3. Technical cooperation with the MICITT

The MICITT is playing a central role in the transition to digital broadcasting, and is one of the driving forces behind technical cooperation related to institutional facilities. Like in Japan, the planning of digital channels was a major issue in Costa Rica, so I spent a lot of time assisting in this regard. To avoid spending too much time on ad hoc discussions and explanations, I summarized each item in the form of a technical report on which subsequent discussions and explanations could be based. These reports were used in internal discussions at the MICITT, and were also reflected in local laws, regulations and internal ministerial documents, and were used in materials for meetings with other organizations.

• Circuit design and planning criteria

I introduced data such as the circuit design concepts presented in ITU-R BT.1368, the basis of calculations used to obtain planning reference values in Japan and Brazil (required field strength and interference margins), and the reference values of other countries that have already adopted ISDB-T, such as Peru and Ecuador.

• SFN feasibility study

In Costa Rica, I studied the feasibility of using a single frequency network (SFN) to make effective use of frequency by covering the entire country with a single channel. Using an electric field simulation, I studied the possibility of introducing an SFN in the transmitter stations at 8 typical locations, and I reported the results to a joint committee comprising government agencies and other organizations such as broadcasters.

• Technical evaluation of the draft channel plan

I performed a technical evaluation of a draft channel plan compiled by the MICITT. After performing a computer simulation to analyze the electric field strength, we discussed the possibility of interference of analog broadcasts, and proposed the importance of a graduated increase in power and interference studies when starting digital broadcasting.

• Other

I studied the possibility of interference with neighboring countries, conducted a technical evaluation of draft revisions to the national frequency plan, studied interference between DTV and IMT, and supported other activities including the preparation of a draft inspection manual for use at the start of broadcasting, the allocation of Network IDs and Service IDs, and the use of gap filler technology.

4. Commencement of digital services by the state-owned broadcaster

A systematic review of digital licenses was also carried out, causing long delays in the start of procedures to issue digital licenses to businesses. Under these circumstances, the state-owned broadcaster's digital channels were individually specified in advance, and a technical evaluation was performed in which multiple channel proposals were presented by the MICITT. The results of this investigation were reflected in a policy document defining the digital channels of the state-owned broadcaster. This document was signed by the President on 29th April 2014, and shortly after on 1st May the state-owned broadcaster commenced digital broadcasting for the San José Metropolitan area. This became the first occurrence of officially licensed digital terrestrial television broadcasting in Costa Rica.

Photo 3: The start of digital broadcasting by the state-owned broadcaster

5. Technical cooperation with broadcasters, etc.

I worked with the MICITT to provide technical cooperation to related organizations. I supported the communications supervision agency (a government organization with authority over broadcast licenses and radio administration) with matters including setting the parameters of their electric field calculation simulation software, and developing methods for testing interference of analog broadcasting. I also visited the studios and transmitter stations of small and medium-sized private broadcasters, and provided them with support regarding the facilities and migration procedures needed to start digital broadcasting.

6. Adapting to a unified standard in Latin America, and promoting this standard in Central America

I also interacted with countries outside Costa Rica. In countries that have adopted the ISDB-T system, study groups were set up to achieve unified technical standards. From our specialist Yasuji Sakaguchi, who was at the time on deployment in Peru, I took over as research group coordinator for EWBS (Emergency Warning Broadcast System), proposed an EWBS draft standard at a conference held in Uruguay in May 2013, and obtained approval for our technical standards. Also, in the Central American countries of El Salvador, Honduras and Guatemala, steps are being taken towards reviewing the standards determined based on the ATSC system, and we visited each country to promote the ISDB-T system with the cooperation of Japan's Ministry of Internal Affairs and Communications and the ARIB (Association of Radio Industries and Businesses). In Honduras, I gave a presentation at an event sponsored by the government and seminar lecturers. About one month after this event, Honduras decided to conduct a review of the ISDB-T system.

Photo 4: International experts at the Uruguay conference (From left to right: Matsuoka (Angola), Hirose (Peru), Sato (Uruguay), Nakakita (Ecuador), me)

7. Towards the deployment of digital broadcasting

In parallel with the movement towards starting digital broadcasting by the state-owned broadcaster, TV receivers equipped with ISDB-T tuners have also appeared on the market. About 2 weeks after returning to Japan in early September 2014, a two-day seminar on terrestrial digital broadcasting was held jointly by the Japanese and Costa Rican governments. Several Japanese companies took part, and some of them gave presentations and offered technical training sessions. The event was attended by about 300 people, including government officials, broadcasters and import businesses, making it a very significant event with regard to the development of digital broadcasting in Costa Rica. This was the last thing I worked on in Costa Rica, bringing two and a half years of technical cooperation activities to a close.

Photo 5: Author presenting at a terrestrial digital seminar

8. Finally

I would like to thank everyone who gave me the opportunity to work abroad and everyone who supported me while in Costa Rica, and since the experience I gained in Japan enabled me to carry out my activities without any hitches, I would like to thank everyone who contributed to this prior experience.

Technical Support for ISDB-T in Uruguay

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Engineering Administration Department
Japan Broadcasting Corporation (NHK)

1. Introduction

NHK has been cooperating with the Ministry of Internal Affairs and Communications by dispatching technical experts to provide technical support to countries that have adopted the Japanese terrestrial digital TV system (ISDB-T). From August 2012 to August 2014, I was dispatched to Uruguay, where I spent two years working as a technical expert. This article presents an overview of my activities during this period.

2. Technical assistance for the introduction of ISDB-T in Uruguay

Uruguay is a small country in the southern part of South America with a population of approximately 3.3 million. Its culture is strongly Europe-oriented, and it was the first of the countries in South America to announce that it would be adopting the European DVB standard for digital terrestrial television. However, to keep pace with Brazil and other South American countries, Uruguay announced in 2010 that it was switching from DVB to ISDB-T.

When this announcement was made, the Ministry of Internal Affairs and Communications decided to dispatch a long-term technical expert and provide technical assistance to the Uruguayan government. In August 2012, the state-owned broadcaster began test broadcasts in Montevideo with the help of equipment provided by the Ministry of Internal Affairs and Communications, and I was dispatched from NHK to Uruguay at almost the same time.

3. Technical assistance operations in Uruguay

In Uruguay, a digital switch-over study group had been set up by the government, telecom operator, and broadcaster, and had been working on issues such as the channel plan and the design of the broadcasting facilities for the state-owned broadcaster. My role was to be consulted about various issues from this study group and to propose solutions as a technical assistance advisor. This included a various range of activities from the delivery of programs from production studios to the equipment design used for transmission and reception. My main activities are detailed below.

3.1 Assisting in the drafting of a channel plan

The creation of a broadcasting channel plan is crucial to the initial stages of the transition to digital television and was mainly carried out by Uruguay's telecommunications regulatory agency URSEC (Unidad Reguladora de Servicio de Comunicaciones). When I was first dispatched to Uruguay, the information for their study was insufficient, and I was able to provide technical assistance in a wide variety of ways such as meeting for technical discussions, preparing materials on the prerequisites of their studies, verifying the settings of parameters, and finding ways to resolve issues.

Uruguay's analog TV only broadcasts in the VHF band; therefore, the UHF band is almost completely free. Since the entire country is almost completely flat with no large mountains, it is possible for a single broadcast station to cover a wide geographical area. Furthermore, people predominantly live in urban areas, while almost all suburban households have access to satellite broadcasting and CATV and are therefore not considered part of the terrestrial service area. For this reason, finding suitable channels was thought to be relatively easy. However, since the majority of provincial cities are adjacent to neighboring countries such as Brazil and Argentina, we also had to study and coordinate channel plans with neighboring countries. In the end, about one year of study was required, including international coordination, and Uruguay's national channel plan became law in October 2013.

3.2 Assistance with measurement technology

I guided the basic method and evaluation of measurements for digital broadcasting by confirming the reception of radio wave propagation from the digital test broadcast station provided by

Photo 1: Measuring the radio wave characteristics of an area

the Ministry of Internal Affairs and Communications. In analog broadcasting, the monitoring inspectors in URSEC had only checked video quality, so they had little experience of the numerical evaluation of radio waves and signal quality. However, URSEC recognized the importance of monitoring the quality of radio waves by numerical evaluation in digital broadcasting, and since they owned the same high-performance digital measuring analyzer, they could perform adequate measurements. Since there were few people who were able to use this analyzer function properly, I wrote a simple manual and set up the measurement parameters with the engineers and inspectors of URSEC, and we could record the measurement results while traveling in a car. This made it possible to construct a system that was capable of performing rough checks on the status of a geographical area. Furthermore, by providing a simple manual for measurements and making it possible for every Uruguayan engineer and inspector to use this analyzer, when private-sector broadcasters contacted URSEC at the start of test broadcasting, it became possible for URSEC's inspectors to check areas in a short period of time. For the URSEC monitoring team of just five inspectors that had to monitor all frequencies in the country, this made their work a great deal easier. I also provided URSEC with technical assistance in the form of training and the like on the basis of Japanese practices with regard to management approach for monitoring the quality assurance status of radio waves and the operational status of broadcast stations.

3.3 Human resource development

One of the main goals of my technical assistance activities was to cultivate ISDB-T specialist engineers. Through a range of daily activities, technical training, outside events, and university lectures, I introduced Japan's various technologies and provided technical guidance to cultivate Uruguayan experts in the field of ISDB-T technology. In particular, since there is a shortage of jobs for engineers in Uruguay, young talented engineers can end up emigrating and causing a lack of young television engineers capable of supporting the digital era. Therefore, with the aim of transferring new digital broadcasting technology to Uruguay's young engineers, I opened up a short-term course specializing in ISDB-T and also gave advice about R&D for ISDB-T at the University of the Republic (Universidad de la República), from which large numbers of broadcasters, communication business people, and Uruguayan government engineers graduated. By establishing close relations through these lecturers and R&D, I aimed to produce more engineers who were interested in ISDB-T. Although Uruguay's engineers are both highly knowledgeable and inquisitive, they are also self-educated and have had to make a considerable investment in their own studies. As a result, the advancement of technology is not progressing very well because they are not so keen to pass their knowledge on to others. Since this seemed like a big challenge to me, on various occasions during the two-year period I pointed this out as one of the difficulties Uruguay faces. In order to convey my thoughts, I prepared some Spanish materials for Uruguayan engineers and told them that they should give lectures for other engineers. Although I can take pride in the fact that I was able to increase the number of people interested in the TV broadcasting industry, I hope that this technology will be handed down to others.

Photo 2: URSEC technical training

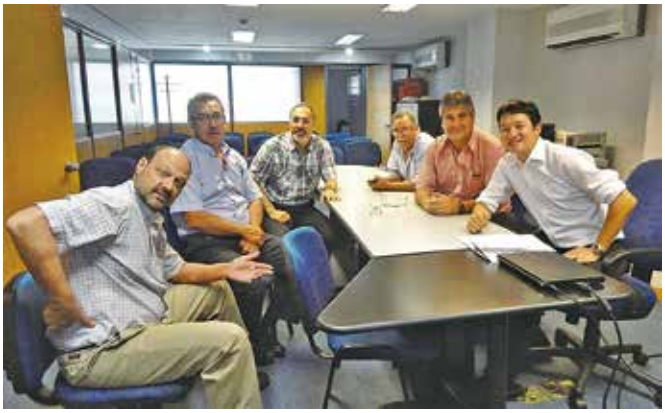

Photo 3: A lecture at the university

4. Conclusion

The two years I spent in Uruguay provided me with very valuable experiences, not only for my work but also for my life. I have heard that the implementation of terrestrial digital television equipment in Uruguay has continued to make steady progress. I hope that the efforts made by me and other Japanese engineers have helped Uruguay in its switch to digital television, and I send my best wishes to everyone I worked and met with while in Uruguay. Finally, I would like to take this opportunity to thank the Uruguayan people who helped me during my stay, the Ministry of Internal Affairs and Communications, who provided a lot of support, DiBEG (ARIB international digital broadcasting outreach group), everyone from Japanese organizations such as NHK, and my family.

Photo 4: Farewell party at URSEC

ISDB-T Activities in Peru

— *Our Neighbors Separated by the Pacific Ocean* —

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1. Introduction

In March 2010, Peru became the second country in Latin America to start digital terrestrial broadcasting based on the Japanese system (ISDB-T: Integrated Services Digital Broadcasting - Terrestrial). In October 2012, I began a two-year assignment in Peru to promote ISDB-T, taking over from the former JICA specialist who had been working there since 2009. This article presents an overview of my activities.

2. ISDB-T introduction in Peru

Peru's master plan for ISDB-T divides the country into four regions by population size. It specifies a frequency plan and provides deadlines for both the start of ISDB-T and the end of analog broadcasting (ASO: Analog Switch Off). When I arrived, Peru had a total of eight terrestrial digital TV stations — seven nationwide TV stations in Lima (the capital city), and one local TV station in Cusco (the gateway city to the Machu Picchu World Heritage Site). Since the master plan indicated that ISDB-T in the Lima metropolitan area would start by June 2014, I visited the local TV stations in Lima to offer much advice about the process of introducing ISDB-T. As a result, a further 13 TV stations were able to start digital broadcasts by the appointed time. In addition, a TV station with rights to broadcast the 2014 FIFA World Cup was able to start ISDB-T in three provincial cities. Peru is still aiming to commence ASO in the Lima metropolitan area by 2020 and to start ISDB-T across the entire country by 2024.

3. ISDB-T introduction activities

3.1 Supporting ISDB-T introduction in accordance with Peru's master plan

The fourth region in the Peru's master plan includes all the other cities not included in the Lima metropolitan area (first region) and 14 major regional cities (six in the second region and eight in the third region). In March 2013, in accordance with the master plan, the MTC (Peruvian Ministry of Transportation and Communication) published plans of frequency allocation (frequency plans) to be used in 74 cities. These frequency plans provide for a population coverage rate of between 85% and 90% over the whole of Peru.

However, when I took up my post I was struck by how little people knew about ISDB-T. In the cities, the majority of households watch cable television (CATV), and only a few watch television by directly using an antenna. Few people were aware that ISDB-T could be watched for free. To raise the profile of ISDB-T, I held ISDB-T seminars with my counterparts from the MTC in the regional cities where it would be introduced in the near future. At these seminars, the MTC officials explained Peru's master plan and the frequency plan, and I explained the advantages of ISDB-T, the project of data broadcasting production, and the project introducing the Emergency Warning Broadcasting System (EWBS). Finally, we held eight seminars with the MTC that over 840 people attended, including local government officials, local broadcasters, and university academics. I think these seminars helped to improve people's understanding of ISDB-T.

Photo 1: ISDB-T local seminar

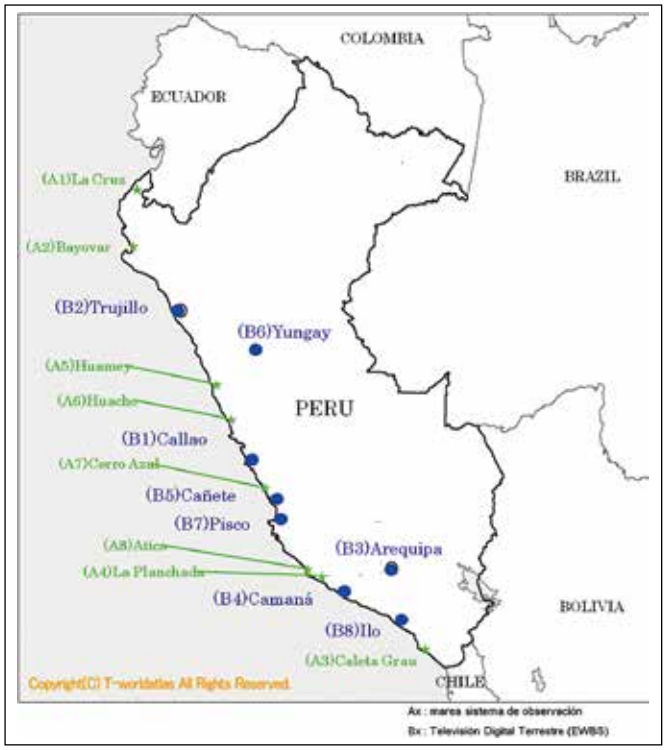
3.2 Supporting EWBS introduction

Like Japan, Peru is situated on the Pacific "Ring of Fire" and occasionally suffers damage from large earthquakes and tsunamis. It is also prone to flooding caused by abnormal weather events such as El Niño. To improve Peru's ability to cope with disasters, we have been promoting the implementation of a system for wide-area disaster prevention funded by the government of Japan. With this system, we plan to construct a national disaster network infrastructure for Peru and to use ISDB-T equipment including the EWBS as components of this infrastructure. In the disaster prevention system using the EWBS, terrestrial digital transmitter facilities will be set up in seven provincial cities. People in these rural areas will then be able to receive emergency information (EWBS signals) multiplexed with the ISDB-T from Lima. To try to complete this project during my stay in Peru, I coordinated with Peruvian agencies and gave technical assistance to IRTP (the Peruvian national broadcaster). Although the Japanese and Peruvian governments released public notices indicating that the disaster prevention system would use ISDB-T in December 2012, unfortunately the facilities could not be introduced during

my time in Peru because the Peruvian side did not complete procedures that would have enabled implementation of the full-scale project. Despite being behind schedule, I am informed that this project will be completed in 2016, when trials of this system using EWBS will start.

On the other hand, the EWBS international harmonization was approved at the 6th ISDB-T International Conference held in Uruguay in May 2013. The harmonization includes international area codes across the country and a mechanism for showing text overlays on TV screens by embedding text information in ancillary areas of the screen. When Peru starts operating the EWBS, it will become the first country to implement this international harmonization.

Figure 1: EWBS pilot site



3.3 Practical support for data broadcasting

To encourage the spread of ISDB-T in Peru, ISDB-T services must be enriched, and data broadcasting (data-casting) provides useful services for this purpose. IRTP launched a project of data-casting implementation in partnership with INICTEL (the Peruvian national telecommunications research institute), and I provided technical assistance for this initiative. First, in June 2013, I procured a data-casting server from Japan, and installed it at IRTP. Once the server had been installed, INICTEL and IRTP worked together to produce weather information program data-casts. Finally, in July 2014, IRTP launched weather information data-casting on the terrestrial digital channels. Now, IRTP broadcasts the updated data-casting program including the weather forecasts, maximum/minimum temperature, humidity, and ultraviolet (UV) index for each region of Lima every day.

Photo 2: On-air sample program of data broadcasts

4. EWBS receiver development

I also worked on the development of equipment capable of receiving EWBS signals and data-casting. In Latin American countries that have adopted ISDB-T, high-definition TV sets are being sold that are compatible with the so-called Japanese-Brazilian ISDB-T system (ISDB-Tb), but TV sets able to receive both EWBS signals and data-casting have not appeared on the market yet. Thus, I started a project to develop receiver equipment with INICTEL. We donated development kits including STBs (set-top boxes) based on ISDB-Tb, EWBS receiver chips made by a Japanese manufacture, TS (Transport Stream) modulators, and test stream embedded EWBS. The aims of this project are to implement an EWBS receiver chip in STBs compatible with data-casting and to display superimposed emergency information on TV screens. Unfortunately, the second prototype receiver had just been produced when my deployment in Peru ended. However, I have heard from INICTEL and the JICA Peru office that INICTEL has kept the project going and has finished production of a disaster warning speaker that contains an EWBS receiver chip and sounds like a large siren. If the EWBS starts operating, these disaster warning speakers can be set up on city streets around the reception area. I hope that they will continue with this project in Peru in order to develop a TV-type receiver.

5. Conclusion

Peru has strong ties to Japan. Although Japan and Peru are far apart, they are also neighbors separated by the Pacific Ocean, and the Peruvians strongly hope that Japan will be able to support them in many fields, including ISDB-T. I feel a sense of pride at having spent two busy years in Peru to promote ISDB-T. Another JICA expert has now taken over my role there. I hope that our work will help them to deploy ISDB-T throughout the country and that the EWBS disaster prevention system will eventually be able to save people's lives and property. Finally, I would like to express my sincere gratitude to everyone who supported my efforts during this two-year period.

Photo 3: EWBS-compatible disaster warning speaker

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

Hisao Nakakita
Deputy Director
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Engineering Administration Department
Japan Broadcasting Corporation (NHK)

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.

Regarding Japan's Declaration to be the World's Most Advanced IT Nation

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1. Introduction

Japan is taking the opportunity for economic revival by adopting a new economic strategy (Abenomics) with positive future expectations together with investment for the 2020 Tokyo Olympics and Paralympics. However, with Japan's post-bubble economic model of mass production and price competition reaching its limits and amid growing calls for a reform of Japan's industrial structure, we are now facing many pressing issues such as preparing for the super-aging society that is arriving at an unprecedented speed, dealing with the reduced size of the workforce and increased social security claims resulting from this demographic shift, coping with large-scale natural disasters that are still giving cause for concern, updating our social infrastructure that was mostly developed during the bubble economy period, securing a stable and economical energy supply, and improving our food self-sufficiency. It could be argued that no other developed country is doing as much as we are to address such issues.

In June 2013, the government published a document called "Declaration to be the World's Most Advanced IT Nation" (abbreviated to "IT Declaration" below) with the aim of leveraging IT as an engine for economic growth and effectively resolving the abovementioned issues that Japan is facing. In the same month, a Chief Information Officer (CIO) was newly appointed by the cabinet to control the government's IT strategy, and after two years of effort, we have already seen effective results in some fields, and progress is being made in the development of new infrastructures for the utilization of IT in Japan.

This article presents a timeline of how the IT Declaration was established, the achievements that have been made so far, and the challenges that may appear in the future.

2. Japan's IT policy

Japan has designed and implemented its IT strategy with a view to establishing a national platform including legal systems and a communication infrastructure whereby information and knowledge can become a source of added value. Part of the national IT strategy was set out in "Basic Law on the Formation of an Advanced Information and Telecommunications Network Society" (called "IT Basic Law"), which was brought into effect about fifteen years ago in 2001. In view of the fact that the use of information and communication technology (ICT) can help people respond effectively to sudden large-scale changes in the socioeconomic structure on a global scale, this law established principles and frameworks for the rapid, focused promotion of measures related to the formation of an advanced information and telecommunications network society. Also, the IT Strategy Headquarters which is headed by the prime minister was set up to promote the formation of an advanced information and telecommunications network society based on this law. Its vice directors are the IT policy minister, the chief cabinet secretary, and the minister for economy, trade and industry. It also includes various other government ministers and industry experts among its members. Since the IT Basic Law was brought into effect, the headquarters has acted in the capacity of a control tower, formulating IT strategies and promoting the focused and rapid deployment of resources for the formation of an advanced information and telecommunications network society.

Japan formulated a number of IT strategies during this period. For example, the "e-Japan" strategy that was designed in 2001 accelerated the provision of a broadband network infrastructure, resulting in Japan having some of the world's best broadband services in terms of speed and cost. The "i-Japan 2015" strategy of 2009 took a medium-and-long term view of where Japan should be heading in the future. Among its aims was the promotion of a "citizen's electronic post box," which evolved into The Social Security and Tax Number system.

However, there has been a poor level of public satisfaction with the use of IT in government services and in fields such as medicine and education. In addition, there are still problems remaining such as wasteful government investment in IT and reduced convenience. Furthermore, there are many other issues that have yet to be resolved, such as disparities in the use of information between different regions and different generations and issues related to security measures.

This has been attributed to various causes including inadequate business process reengineering (BPR) across organizations due to an improper grasp of user needs and insufficient cooperation between government ministries and other agencies, including overlapping investment in the IT promotion measures of different ministries. There is consequently a strong demand for these issues to be resolved.

3. Declaration to be the world's most advanced IT nation

In 2013, to reformulate the government's IT strategy in light of such issues, a law (Government CIO Act) involving amendments to parts of Japan's Cabinet Act and other legislation was announced and enacted. Under this new scheme, a member of the cabinet (Government CIO) would be given

cross-departmental authority to control the cabinet's ICT policy-making. The Government CIO would also be added to the IT Strategy Headquarters to take over some duties of the director (prime minister). This law made it possible for the Government CIO to coordinate the activities of each department at a high level, allowing Japan to reduce inefficiencies in the government's IT investment and establish a system that can effectively implement the above measures while making things more convenient for citizens.

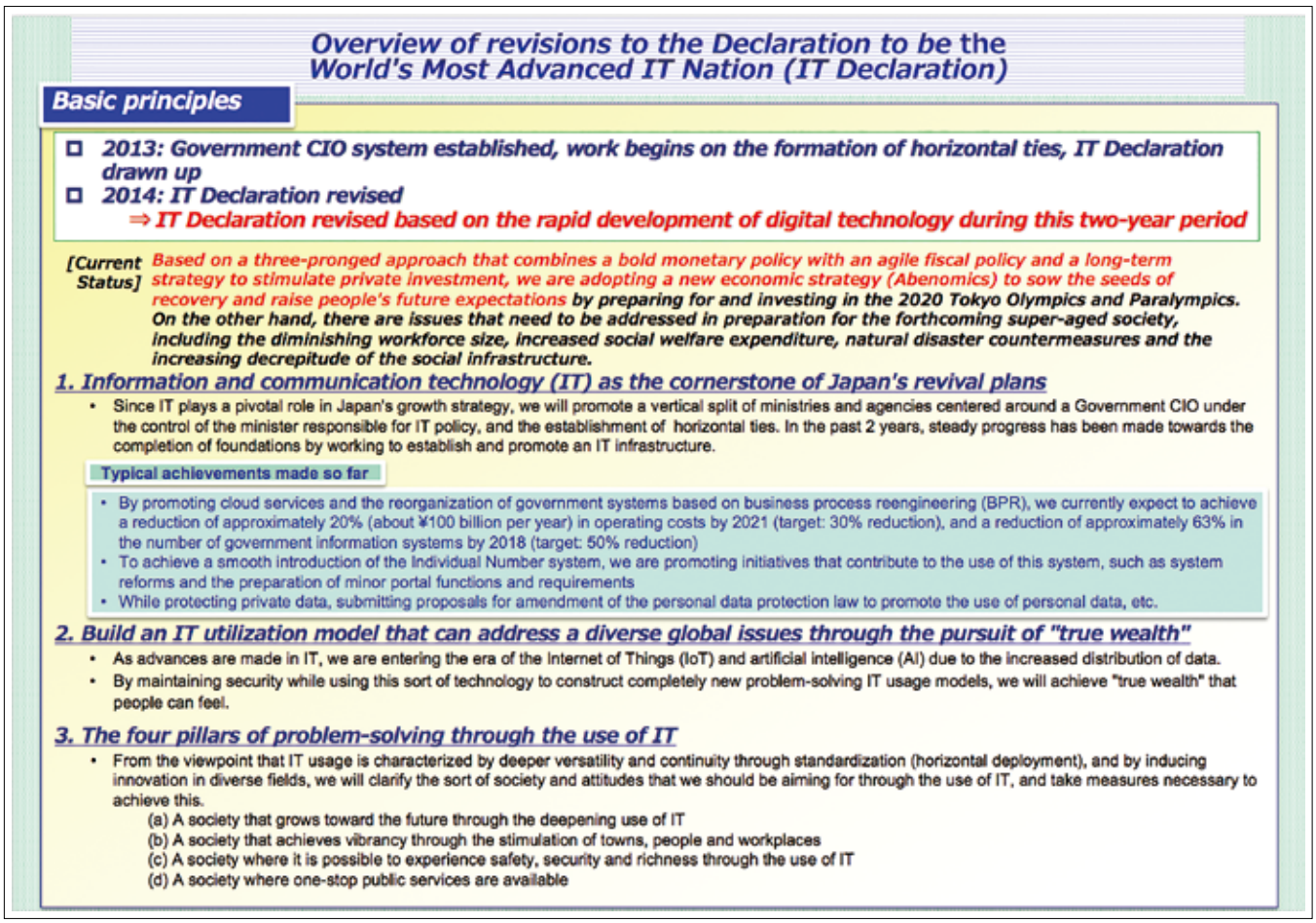
Under this revised system, as mentioned above, IT is defined as the engine for economic growth and as one of the country's growth strategy, and the IT Declaration was created with the aim of building the world's most advanced IT society where everyone can feel the benefits of IT. This system has since been revised twice in order to keep up with changes such as the dramatic progress of IT technology.

The IT Declaration describes four pillars that the society should strive to attain: achieving future growth through the deeper utilization of IT, making use of IT in towns, individually, and in the workplace, allowing people to experience the safety, security, and rich possibilities offered by IT, and using IT to provide one-stop access to public services.(Figure 1)

More specifically, the following implementations are aimed for the year 2020, when Tokyo will host the summer Olympics and Paralympics. These implementations, which are needed to make this society a reality, have also been summarized in the form of a road map that clarifies the actions to be taken by each government ministry/agency and the schedule for these actions. On the basis of this road map, the Government CIO will provide oversight for all of the government's IT policies across different government ministries and agencies while continuing to promote the PDCA cycle and remaining deeply involved in technical developments.

- Building new Big Data business models utilizing Big Data in the IoT era
- Building institutional frameworks to accelerate the utilization of IT in society as a whole
- Preparing an information-sharing platform to promote the utilization of IT by local governments
- Ensuring people can access suitable medical and nursing services if necessary

Figure 1: Overview of IT declaration



- Making Japan's roads environmentally friendly and the safest in the world by eliminating traffic accidents and congestion
- Making sure everyone has the information they need in the event of a natural disaster, wherever they are
- Facilitating efficient and safe energy management
- Making one-stop e-government services available on any terminal by making thorough use of cloud technology and The Social Security and Tax Number system

4. The latest concrete initiatives and achievements

Breaking silos among government ministries and agencies under the IT Declaration led to substantial progress in the implementation of the IT infrastructure including a reformed government information system, the launch of The Social Security and Tax Number system, and the revision of the Act on the Protection of Personal Information. Similar initiatives are being taken in other countries around the world, but Japan is making significant progress. According to the United Nations E-Government Survey of 2014, Japan jumped from 18th place to 6th place in two years, and in the World Economic Forum ICT ranking of 2015, Japan rose to 10th place from 16th place the previous year and 21st place the year before that.

Two recent examples of the efforts and achievements of Japan's IT policy are introduced below. The first is the promotion of reforms in governmental information systems. The second is the establishment of the Act on the Protection of Personal Information and amendment of the Act on the Use of Numbers to Identify a Specific Individual in the Administrative Procedure.

■ Reforming the government information system

The government is currently working on improvements to the government information system based on the IT Declaration. This involves consolidating systems and migrating them to the cloud and promoting business process reengineering through the use of IT. The aims of this initiative are to halve the number of governmental information systems by 2018 (compared with the 2012 figure of approximately 1,450) and to achieve a 30% reduction in the annual operating costs of these systems by 2021 (compared with the 2013 figure of approximately ¥400 billion).

To halve the number of governmental systems, the plan is to integrate and consolidate them down to a total of 542 systems (a reduction of about 63% from the current number) by formulating a governmental IT system reform road map indicating the medium-to-long term reform process.

To achieve a 30% reduction in operating costs, a cost reduction plan was formulated to clarify the cost-saving measures and estimated savings in each ministry. In particular, for large-scale systems, the Government CIO has so far personally held over 380 interviews with various ministries and agencies. So far, the estimated savings are in excess of ¥100 billion. In particular, for large-scale systems whose annual running cost exceeds ¥5 billion, the 30% reduction has almost been achieved.

The achievement of these efforts to reform information systems in the Japanese government will be applied to local governments in cooperation with the Ministry of Internal Affairs and Communications. More specifically, after analyzing a case study involving the prior introduction of a local government cloud service and providing the advice and information necessary for local governments on its introduction, the service was found to cause a 30% reduction in operating costs and support business process reengineering (BPR).

Thus, at the levels of national and regional government, steady progress in the reform of information systems is leading to greater spending efficiency and the creation of an environment where diverse high-quality public services can be offered to citizens of all levels.

■ Amendment of the Act on the Protection of Personal Information and the Act on the Use of Numbers to Identify a Specific Individual in the Administrative Procedure

In September 2015, the government passed amendments to the Act on the Protection of Personal Information and the Act on the Use of Numbers to Identify a Specific Individual in the Administrative Procedure.

With the impending arrival of the Big Data era in which vast amounts of personal data will be collected and analyzed, the vague definition of personal data has made it difficult to utilize information in some business fields. To break out of this situation and revitalize the economy, the Act on the Protection of Personal Information was improved so as to eliminate the gray zone by clarifying the definition of personal data and by stipulating that businesses are free to use anonymized data that has been processed to make it impossible to determine whose data it is. As for the Act on the Use of Numbers to Identify a Specific Individual in the Administrative Procedure, although its use is currently restricted to three fields (social welfare, tax, and disaster countermeasures), it is expected that further improvements to efficiency and convenience will occur in the future. Amendments were made to expand the scope of application to fields such as the following.

(a) Numbering of saving accounts
(b) Work related to special medical examinations and health guidance
(c) Sharing vaccination histories in work related to vaccination

On January 1 of this year, a personal information protection committee was established as a third party organization to provide consistent monitoring of how personal data is handled, after which the revised system was put into action.

5. Examples of future work

As described above, the IT Declaration was set forth in 2013. Although results have been achieved in some fields, we have just started building the world's most advanced IT nation, and there are still many issues to be addressed before the Japanese people can really feel that they are living in such a society. As an example of one of the main issues to be tackled in the future, we will introduce the state of considerations related to the use of IT including the promotion of a sharing economy.

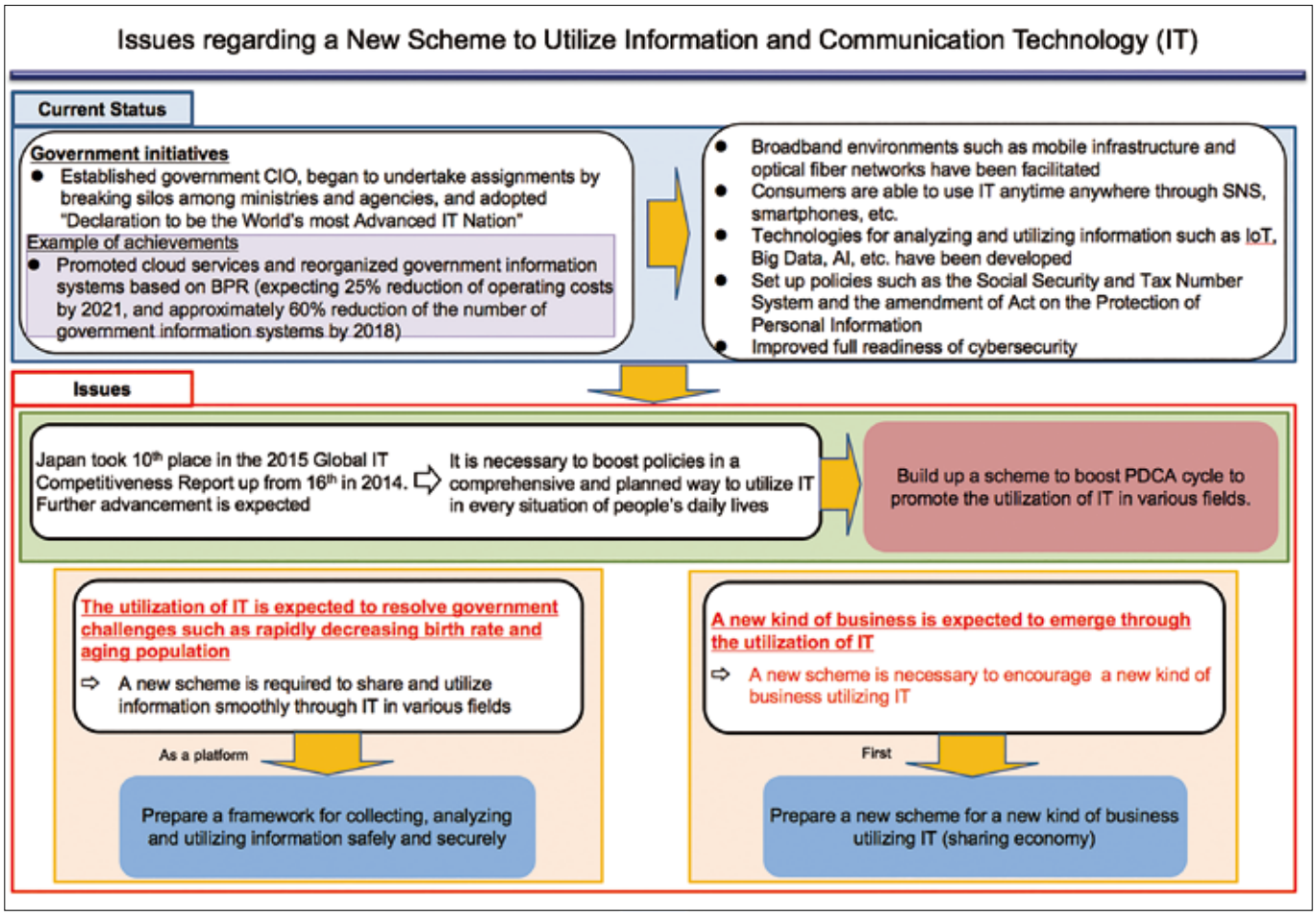
Achieving a smooth flow of information through the use of IT is an effective way of resolving issues in a super-aging society and is one of the main pillars of Japan's growth strategy, which is also described in the Japan Regeneration Strategy and the IT Declaration.

In response to this, a study group was established under the IT Strategy Headquarters at the end of October last year to investigate the utilization of IT by institutions. After some lively discussions, it issued an interim report regarding the basic direction of institutional development aimed at utilizing IT to smooth out the flow of information. In this report, as the basic direction for institutional development related to the utilization of IT, it was decided that ongoing efforts should be focused on promoting the planning of comprehensive plans for the effective and ongoing promotion of speedy measures to promote the flow of information, the use of IT to achieve a smooth flow of information, and the reformation of business models for this purpose.

6. Conclusion

IT is a versatile tool that is used in all sorts of fields. It is not only an engine for economic growth but also has the ability to solve the challenges faced by Japan. While IT evolves every day in accordance with Moore's Law, efforts to eliminate anxiety and risk while using IT to its greatest possible benefit are extremely important if Japan is to achieve the goal of creating an IT-enriched society where everyone can feel the benefits of IT, and to this end, the government will continue to make a concerted effort to promote the IT Declaration.

Figure 2: Issues regarding a new scheme



ITU-R Documents Database Search Facility and its Future Development

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This article explains the current development status and future plans for the ITU-R Documents Database Search Facility that has been under development since 2012 at the ITU Radiocommunications Bureau (BR).

1. Background

The development of the ITU-R Documents Database Search Facility was initially proposed by the Russian Federation at the ITU-R Study Group 1 (SG1) Working Party (WP) 1B meeting in June 2012. They proposed that the ITU Radiocommunication Bureau (BR) develop a database that makes ITU-R Recommendations searchable by the frequency bands specified in Article 5 of the Radio Regulations (RR). The objective is to raise awareness of ITU activities and to facilitate ITU members' work on ITU-R Recommendations.

The Russian Federation proposal was discussed by ITU-R SG1, and many countries agreed that it would be good to study the proposal and have it considered by the Radiocommunication Advisory Group (RAG). Thus, the ITU-R SG1 Chairman submitted a document regarding this proposal to the 19th RAG Meeting in June of the same year.

During the RAG Meeting, it was pointed out

1) the classification of ITU-R Recommendations should not only be by frequency range but also by radio service and, if available, application;
2) the classification of ITU-R Recommendations should not be by the frequency bands specified in Article 5 of RR but on the actual frequency ranges covered by the Recommendation;
3) it is not always clear from the title and scope of ITU-R Recommendations to which frequency band a Recommendation applies. Thus, to help members identify ITU-R Recommendations by frequency band, it was recommended to develop a database that would enable searching for a recommendation applicable to a given frequency band, preferably in combination with information about the radio service and the application covered by the recommendation.

The RAG invited:

1) the Director to develop a database, within existing budgetary limitations, and incorporate information about existing ITU-R Recommendations for which frequency bands are already indicated in the title and/or scope;
2) the responsible Study Group to consider and provide the relevant information on ITU-R Recommendations for which the frequency bands / radio services / applications are not specified in the title or scope;
3) Study Groups to identify in new or revised ITU-R Recommendations, as far as possible, the frequency range for which the ITU-R Recommendation is applicable.

The Director and the ITU-R Study Groups were invited to inform RAG in 2013 on progress with respect to these activities.

In the same year in August, I joined the ITU Radiocommunications Bureau and was assigned to work on the development of the ITU-R Documents Database Search Facility. Also, thanks to a voluntary contribution from the Japanese government (Ministry of Internal Affairs and Communications) in April 2014, development of the database was accelerated and its scope was expanded to also include ITU-R Reports, ITU-R Questions, ITU-R Resolutions, and ITU Handbooks.

Substantial support from Dr. Akira Hashimoto of NTT Docomo and Mr. Masaharu Araki of Docomo Technology was also received in the conceptual and preliminary design of the database and in the extraction of data.

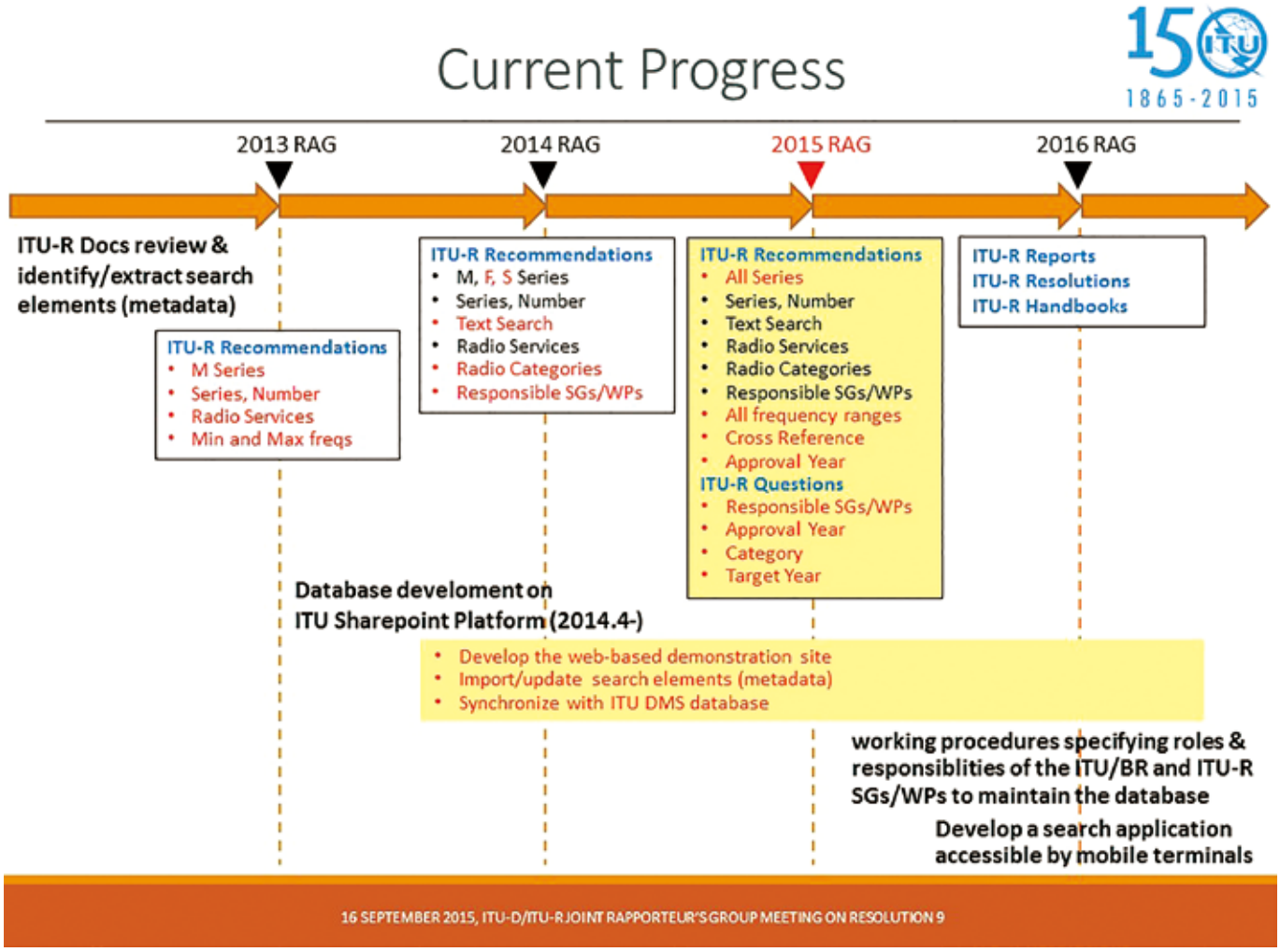
2. Consideration of ITU-R documents search database facility at ITU meeting

Progress in developing the database is being reported at the RAG Meeting every year. Also, progress on dissemination of the database is reported to ITU-D members at the ITU-D/ITU-R Joint Rapporteur's Group Meeting on Resolution 9.

A demonstration of the functions for searching by Recommendation series, Recommendation number, frequency, and radio services for the M Series recommendations was conducted at the 20th RAG Meeting in 2013. In addition to these search criteria, a demonstration using text search, category, and responsible SG/WP for the M, F, and S Series Recommendations was conducted at the 21st RAG Meeting in 2014. And by 2015, search of all ITU-R Recommendations became available as a demonstration version for all the planned search criteria. In October 2015, search functions for the ITU-R Recommendations became available as an operational version.

By October 2015, development of the database for ITU-R Questions had been completed and the database became operational. Presently, a demonstration version is being used for searching ITU-R Reports, and preparations are underway on creating databases for ITU-R Resolutions and ITU Handbooks.

Figure 1: Progress and future plans for ITU-R Documents Database Search Facility



3. Target documents for current search database

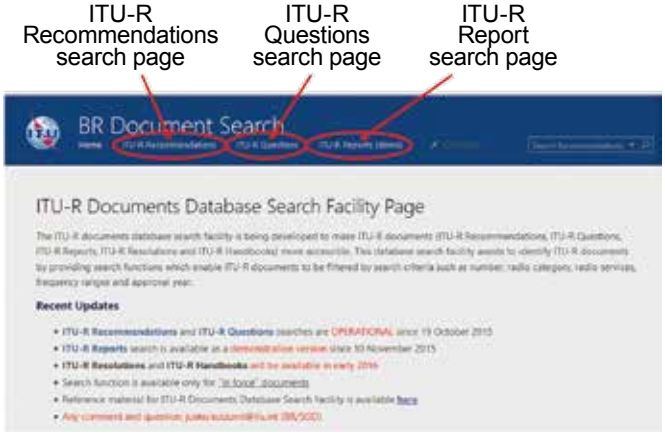
The ITU-R Documents Database Search Facility currently covers the ITU-R texts defined in ITU-R Resolution 1, except ITU-R Decisions and ITU-R Opinions. That is, it currently covers ITU-R Resolutions, ITU-R Questions, ITU-R Recommendations, ITU-R Reports, and ITU Handbooks. The WRC Resolutions and WRC Recommendations listed in the Radio Regulations are not included within the scope of this project.

4. Functions of ITU-R Documents Database Search Facility

In the next Chapter, the search criteria, search database, page usage, etc. for the current ITU-R Documents Database Search Facility are explained for each of the target documents.

The ITU-R Documents Database Search Facility (https://extranet.itu.int/brdocsearch) can be accessed using an ITU TIES account or using a guest account which can be obtained at https://www.itu.int/net/iwm/public/frmUserRegistration.aspx. The site can also be accessed through links in the 《 ITU-R Documents Search Tool 》 under "Documents" on the ITU-R RA, RAG, SG, WP, and Coordination Committee for Vocabulary (CCV) websites.

Figure 2: Homepage of ITU-R Documents Database Search Facility (as of March 2016)



5. ITU-R Recommendations

(1) Search criteria

ITU-R Recommendations can be searched using Series, Radio category, Radio services, Cross-references with RR, Responsible SGs/WPs, Approval year, and Frequency range.

Radio category is a new classification criterion introduced for this database. Classifying the recommendations into 1) Technical/operational characteristics or parameters, 2) Sharing/compatibility issues, 3) Frequency arrangements, 4) Error performance/availability objectives, 5) High Frequency (HF) systems, 6) Antenna reference patterns, 7) Vocabulary, and 8) International Mobile Telecommunications (IMT) enables easily narrowing down the search results. There are Recommendations that correspond to more than one category, while others do not apply to any of the categories (N/A).

Under Cross-reference, Recommendations are classified into "IBR" (ITU-R Recommendations incorporated by reference in the RR, refer to WRC Resolution 27), "Ref." (referred to in the RR but not IBR), and "N/A" (not referred to in the RR). Also, individual Recommendation pages include the particular section where it is referred to in the RR (refer to Figure 5).

(2) Use of search site

The ITU-R Recommendations search page (Figure 3) can be accessed through the "ITU-R Recommendations" link shown in Figure 2, and search can be carried out in two ways (Search function 1 and Search function 2 in Figure 3).

Search function 1 can be used for a simple search using a single criterion. For example, selecting "IMT" under Radio category will show all Recommendations related to IMT.

Search function 1 is useful for narrowing down the results but does not support search using more than one criterion. Thus, if the target is IMT-related Recommendations approved in 2013, Search function 2 must be used.

Search function 2 supports multiple search criteria: Series, Radio Category, Services, Responsible WP, Cross-reference, and Approval year. All recommendations corresponding to the specified search criteria are displayed upon clicking the "Apply" button. Search function 2 thus enables a more accurate search through the use of multiple criteria.

ITU-R Recommendations can also be searched for using frequency range by accessing the link to the frequency search page, which is shown in Figure 3. This is done by inputting the target frequency range (minimum and maximum) in the Frequency range search box (Figure 4) and then clicking "Refine" to narrow down the Recommendations within the specified range. A full-text search of ITU-R Recommendations can also be performed on this page.

Once the target ITU-R Recommendation is found, the individual Recommendation page can be viewed by clicking the document icon on the left of the Recommendation number, as shown in Figure 5. This enables access to the ITU-R Recommendation document file.

Figure 3: ITU-R Recommendations search page (https://extranet.itu.int/brdocsearch/R-REC/) (as of March 2016)

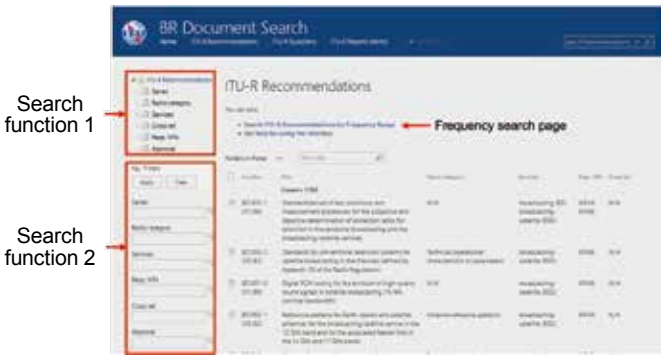
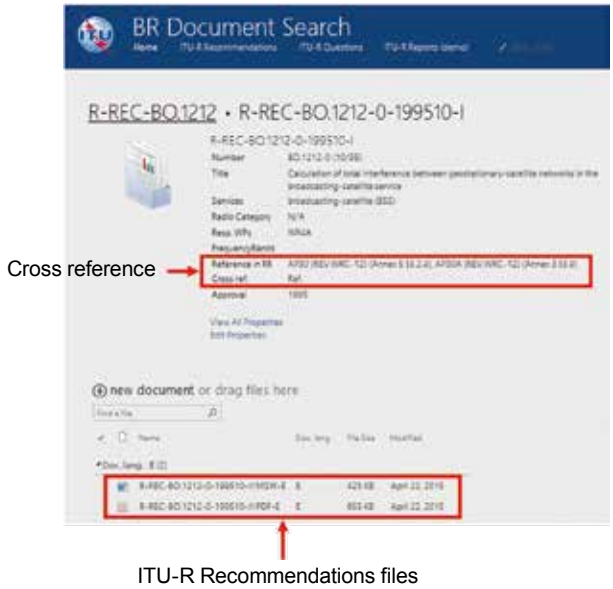


Figure 4: ITU-R Recommendations frequency search page (as of March 2016)

Figure 5: Individual recommendation page (as of March 2016)



6. ITU-R Questions

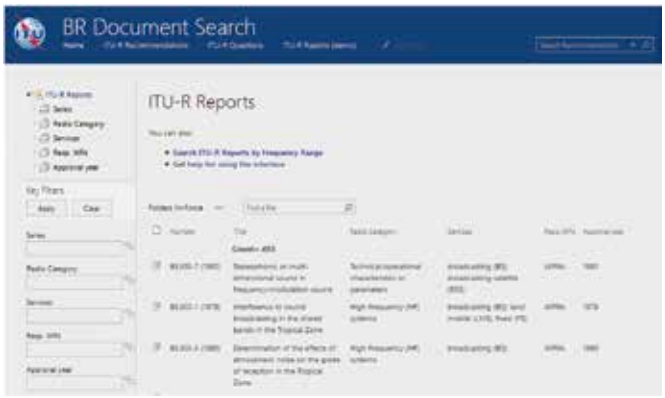
(1) Search criteria

ITU-R Questions can be searched for using Study Group, Responsible WP, Approval year, Target year, and Category. The Target year and Category are extracted from the contents of the Questions documents. The Category for the ITU-R Questions differs from the Radio category of ITU-R Recommendations. It refers to the priority or urgency level of the Question as defined in ITU-R Recommendation 5.

(2) Use of search site

The ITU-R Questions search page (Figure 6) can be accessed from the "ITU-R Questions" link, as shown in Figure 2. Although the ITU-R Questions search page does not have a frequency search function, search is basically the same as with ITU-R Recommendations.

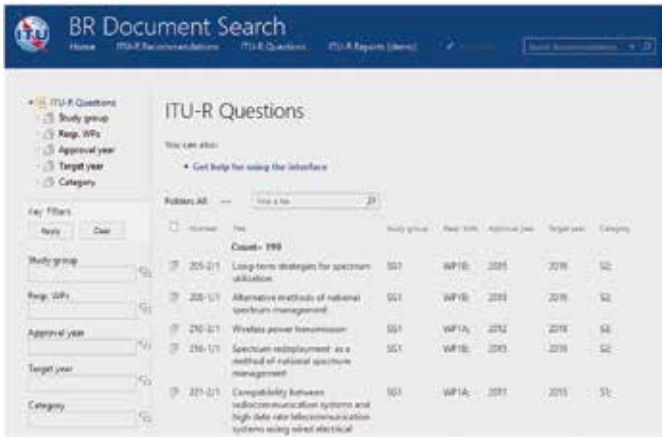
Figure 6: ITU-R Questions search page (https://extranet.itu.int/brdocsearch/R-QUE/) (as of March 2016)



7. ITU-R Reports

The search criteria for ITU-R Reports are exactly the same as for ITU-R Recommendations except for the absence of the Cross-reference criterion. Frequency range search is performed similarly as for ITU-R Recommendations. The ITU-R Reports search page (Figure 7) can be accessed from the "ITU-R Reports" link, as shown in Figure 2.

Figure 7: ITU-R Reports search page (https://extranet.itu.int/brdocsearch/R-REP/) (as of March 2016)



8. ITU-R Resolutions, ITU Handbooks

Search databases for ITU-R Resolutions and ITU Handbooks are still under development and are slated to become operational by this year's RAG Meeting. These search databases will also be accessible from the homepage of the ITU-R Documents Database Search Facility once they are completed as will be the ITU-R Recommendations, ITU-R Questions, and ITU-R Reports search databases.

9. Future plans

In addition to the ongoing development of the databases for ITU-R Resolutions and ITU Handbooks mentioned above, future work includes preparing working procedures for the ITU-R Documents Database Search Facility and developing mobile applications for its use.

(1) Preparation of working procedures for ITU-R Documents Database Search Facility

Since continuous updating of data is crucial to the operation of this search database, a system for handling data updates made during revisions and creation of new documents must be established. We therefore plan to prepare working procedures for the ITU-R Documents Database Search Facility.

(2) Mobile applications

Given the widespread use of iPads and other tablet devices, we also plan to develop applications compatible with mobile OS and mobile devices. We are currently investigating functions to be implemented on mobile platforms.

The search database was created on the Microsoft Sharepoint platform. Going forward, we plan to further improve its convenience through linkage and shared use with other standard databases.

Cover Art

Tousei odoriko zoroe "Sagi musume" The Heron Maiden from the series An Array of Dancing Girls of the Present Day

Kitagawa Utamaro (1753-1806)

On Being Appointed New Chairman of ITU-R Study Group 6

Yukihiro Nishida
Senior Research Engineer
NHK Science & Technology Research Labs.
Chairman of ITU-R SG 6

I was appointed as Chairman of Study Group 6 (SG 6) at the ITU Radiocommunication Assembly held in October 2015. I would like to express my sincere appreciation for the unanimous support.

SG 6 was formed as a merger of SG 10 and SG 11 at RA in 2000 and further restructured at RA-07. I am the third Chairman of SG 6 and the first from the Asia-Pacific region. The appointment would be partly due to my experience as Vice-Chairman of SG 6 and Chairman of WP 6B since RA-07 but mainly due to Japan's pioneering work on broadcasting technologies such as the world's first direct satellite broadcasting, HDTV, emergency broadcasting, and the recent UHDTV.

In the ITU-R dealing with radiocommunication, SG 6 is tasked with studying the end-to-end chain of broadcasting including programme production, transmission and reception, baseband audio and video signals, and quality assessment. While SG 5 is responsible for terrestrial services, terrestrial broadcasting is within the purview of SG 6. This might be due to the consideration that ensuring the quality of broadcasting services is significant and closely related to one of the strategic goals of ITU-R, which is to ensure the necessary performance and quality in operating radiocommunication systems.

SG 6 will study not only terrestrial delivery systems but also requirements for delivering broadcast content through satellite broadcasting and other wireless or wired delivery means as well as content creation and programme assembly for all ways of delivery. Now that end users have access to broadcast content through various delivery means and on various end-user terminals, the challenge for SG 6 would be to study how high quality broadcast content could be produced effectively and efficiently and delivered to end users in such an environment.

The transition from analogue to digital television is ongoing around the world. There are six DTTB systems specified in the ITU-R Recommendations. These multiple systems have resulted from different requirements, and different regions and countries adopt different systems. In developing and standardizing a next generation terrestrial broadcasting system, we need to study various aspects: the need for a single worldwide system, large capacity transmission for UHDTV and beyond, the capability to continuously introduce new technologies, and the diversification of the reception environment.

Center: the author
Left: BR Director, Mr. Rancy, Right: Counsellor, Mr. Hai

Research and development of new terrestrial television broadcasting systems is on the move. In order to introduce a new service adopting new technologies, it is essential to continue existent broadcasting services without interruption until viewers are prepared to receive the new service by installing new receivers. Simulcasting for a transition period is a solution, but it requires additional spectrum. It would be a pity if a lack of spectrum prevents the introduction of new broadcasting services. It is also important to consider the efficient use of spectrum.

At the first SG 6 meeting, held on February 5, 2016, the structure of SG 6 Working Parties and their Chairmen and Vice-Chairmen were approved. An outstanding issue from the previous study period on image formats for high dynamic range television was settled with the agreement of a draft new Recommendation ITU-R BT.[HDR-TV] for an adoption and approval procedure, which will enable the broadcasting industry worldwide to prepare for the launch of a new broadcasting service.

Photo: The first SG 6 meeting on February 5, 2016

Broadcasting is mass media that provides audiences with high quality audiovisual content. SG 6 should continue to be the pioneer of international standardization for broadcasting services, and it should study new audiovisual content and applications as well as new delivery systems and networks. I would like to invite all members of ITU-R to get involved in the discussion and contribute to the work of SG 6.

= A Serial Introduction Part 3= Winners of ITU-AJ Encouragement Awards 2015

In May every year, the ITU Association of Japan (ITU-AJ) proudly presents ITU-AJ Encouragement Awards to people who have made outstanding contributions in the field of international standardization and have helped in the ongoing development of ICT.
These Awards are also an embodiment of our sincere desire to encourage further contributions from these individuals in the future.
If you happen to run into these winners at another meeting in the future, please say hello to them.
But first, as part of the introductory series of Award Winners, allow us to introduce some of those remarkable winners.

Yoshinori Kawana
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Fields of activity: JICA

Technical cooperation in the launch of Argentina's ISDB-T terrestrial digital broadcasting system

Thank you for this prestigious international activities award.

I worked as an on-site JICA specialist during the deployment of Argentina's ISDB-T terrestrial digital broadcasting system. After Argentina first started terrestrial digital broadcasting the capital city Buenos Aires in April 2010, a plan was drawn up to extend coverage to 75% of households by building a total of 47 relay stations in 23 provincial capitals and major cities throughout the country. I recommended that the government agencies allocate at least two broadcast frequencies for each network, but was told this would not be possible due to a lack of available bandwidth and the need to begin broadcasts nationwide as early as possible. We therefore used the same frequency at relay stations throughout the country.

At first, it was feared that this would cause widespread interference issues. However, since the inhabited regions of Argentina are small compared to the overall size of the country, there are only limited cases where a viewer's household receives signals from more than one relay station. We therefore decided that it would be possible to avoid large-scale interference, and went ahead with the implementation of this system.

In urban areas where the relay stations are concentrated, we had to construct a single frequency network (SFN), which is one of the features of the ISDB-T system. Since Argentina has a large land area, we initially planned to broadcast the signals by satellite. However, implementing a SFN requires adjustment of the signal delays, so for relay stations in urban areas we switched to transmission via optical cables and expanded the broadcast area by measuring and adjusting the signal transmission timings for each relay station.

In this international cooperative project, I felt that technical cooperation in countries that have adopted the ISDB-T system can not only promote the spread of terrestrial digital broadcasting, but can also build relationships with related industries and promote technical cooperation across the whole ICT sector. In the future, I hope to continue working on international cooperative projects, as well as on the development of broadcasting technology and equipment maintenance.

Finally, I hope that the development of terrestrial digital broadcasting in Argentina will benefit the country's society and culture by enriching the lives of its citizens. Also, I would like to thank everyone at the Ministry of Internal Affairs and Communications, ARIB, the Japanese Embassy in Argentina, JICA, the manufacturers of broadcast equipment, and Japan Broadcasting Corporation for their support in this endeavor.

Kohei Kambara
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Fields of activity: ITU-R, APT, APG, WP5A, WP6A, JTG4-5-6-7, WRC-15

A study of sharing and compatibility between broadcasting and other services on the WRC-15 agenda

I am truly honored to receive this distinguished award. I would like to take this opportunity to thank everyone who helped with this project.

The WRC (World Radiocommunication Conference) is a major international conference held roughly every four years to review the Radio Regulations that define international usage of radio frequencies. Since most of the frequencies are already used with various applications, before allocating frequencies for a new application, it is first necessary to perform adequate technical studies to ensure that existing applications will not be adversely affected. It is important to hold discussions at an international level because radio waves can cross international borders between neighboring countries.

One of the agenda items at WRC-15 was the additional

frequency allocation for IMT (International Mobile Telecommunications), for which the proposed candidate was the broad frequency range from 470 to 6425 MHz. In this range, the frequencies from 470 to 710 MHz are used for terrestrial digital broadcasting in Japan. Therefore, it was essential to conduct a technical study on the effects of IMT on broadcasting.

Since this agenda was created at WRC-12, technical studies relating to the sharing and compatibility of broadcasting and IMT have been performed worldwide. However, hardly any studies have been done (as of 2014) regarding the effects on the ISDB-T system used for digital terrestrial broadcasting in 17 countries around the world, including Japan. Therefore, studies had to be conducted from first principles. At first, we were not sure what approach to take in these studies. After careful consideration, we performed an interference simulation assuming an ISDB-T receiver model. We submitted contributions to joint task group JTG 4-5-6-7, which was formed to perform technical studies on this agenda item. Since the ISDB-T system was developed in Japan, we were expected by the other countries using this system to lead these technical studies. The content of Japan's contribution was well received by other countries. As one of the countries using the ISDB-T system, Argentina also submitted the results of a study, and these results were adopted in report ITU-RBT.2337 and the CPM report, which formed the basis of discussions at WRC-15.

In the future, as a broadcast engineer, I hope to help ensure that frequencies used for broadcasting are adequately protected and to contribute to the development of the broadcasting service.

Hiroshi Fujita

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Fields of activity: JICA, Design and maintenance of digital terrestrial broadcasting network

Enriching people's lives through the spread of terrestrial digital broadcasting

From April 2010, I spent a year stationed abroad as a JICA specialist to support the introduction of terrestrial digital television in Venezuela, which is the fifth country in South America to adopt Japan's ISDB-T terrestrial digital television system. In this capacity, I worked on terrestrial digital broadcasting facilities of the country's state-owned broadcaster in a project of the Ministry of Internal Affairs and Communications accompanying the adoption of the Japanese system in Venezuela's terrestrial digital television. I also acted as a coordinator between local technology consultants, local broadcasters, and Japanese manufacturers. Specifically, we started with a study of local broadcast stations. We confirmed that the state broadcaster's base broadcasting station/Los Mecedores transmitter, which is situated at an altitude of 2,000 m in the El Ávila mountains and covers the city of Caracas, and the relay transmitters in the Caracas suburbs are at ideal positions for covering the terrestrial digital service area. Also, based on a survey of the relay transmitters in Venezuela's second city of Maracaibo and a technology trend survey at the South America ISDB-T International Forum, I proposed the introduction of an ISDB-T network in Venezuela.

Next, I advised the technical committee studying the master plan for the introduction of digital television, and helped to steer the proposals towards completion. Furthermore, to promote the spread of terrestrial digital television, we surveyed other South American countries that have adopted ISDB-T and have already established standards for digital receivers, and it was possible to stimulate the committee's discussions by reflecting the results of this survey, leading to the creation of better standards. Also, as part of the technical support, we arranged activities such as allowing a number of Venezuelan technicians to participate in events in Japan such as the terrestrial digital STB introduction training program, and organizing lectures on the practical implementation of Japanese terrestrial digital broadcasting at terrestrial digital seminars including the fifth anniversary celebrations of the national research institute. In addition, to ensure that terrestrial digital broadcasting equipment can be imported smoothly into Venezuela from Japan, I worked with the secretary of the Japanese Embassy in Venezuela to reduce the customs clearance period for this kind of installation.

Although the period between customs clearance and equipment installation was very short, we were able to launch the delivery of terrestrial digital broadcasting from the Los Mecedores broadcasting stations.

In the future, I hope to research the trends in Central and South America following the adoption of the Japanese terrestrial digital television system, and to examine how far terrestrial digital technology has progressed so far and the future prospects of this technology.

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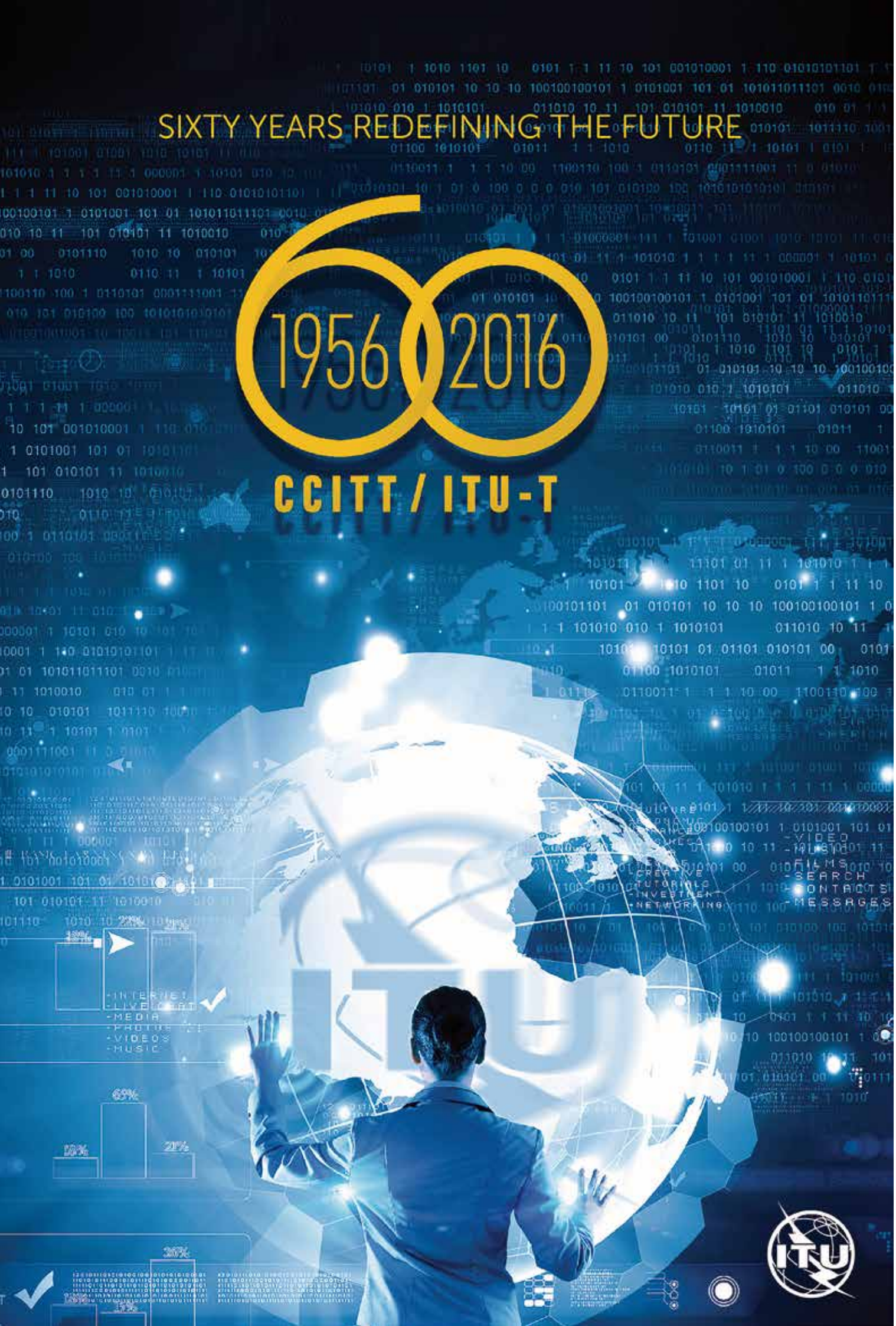

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