DiBEG
Digital Broadcasting Experts Group

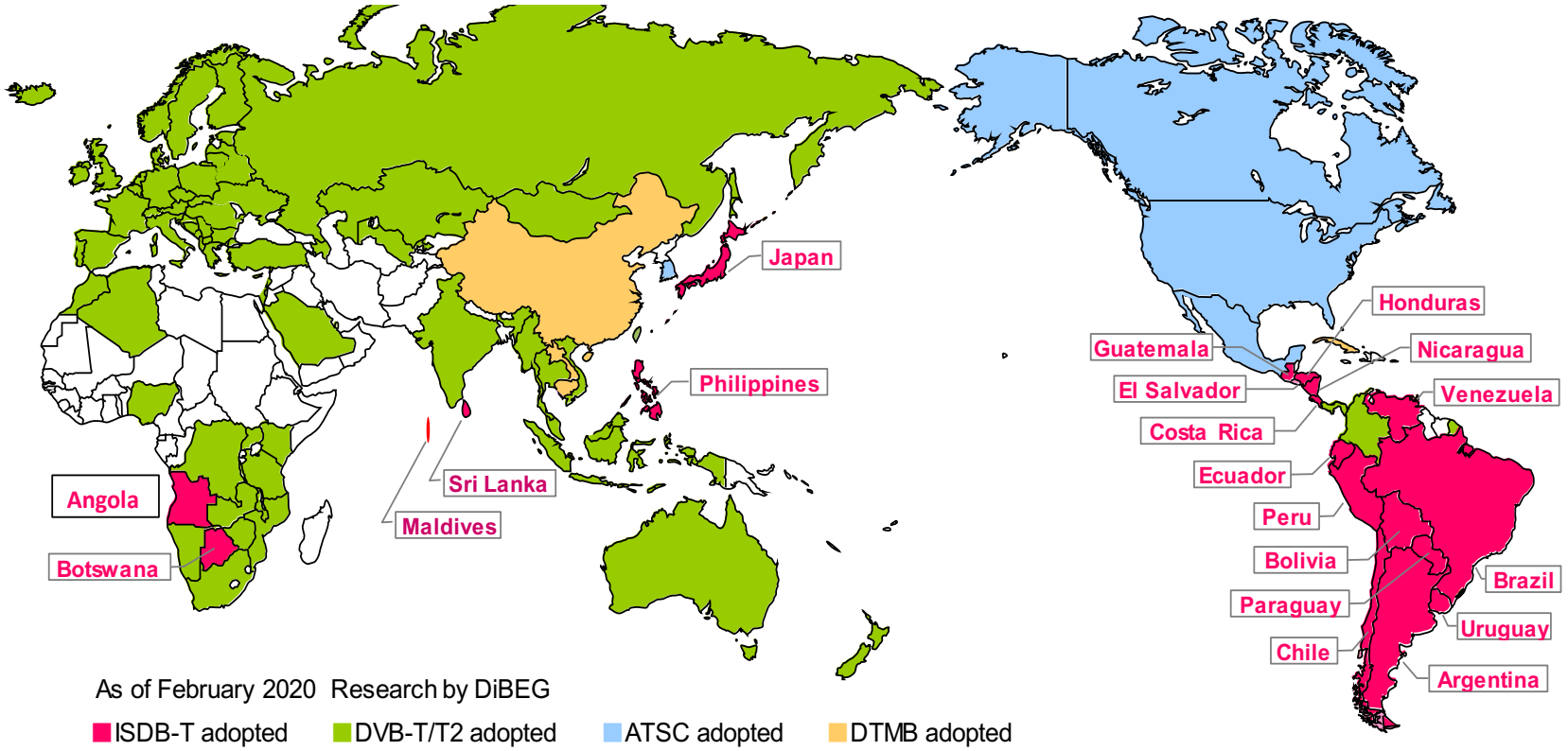
Activity of disseminating Japanese EWBS technology

(Emergency Warning Broadcast System)

September 2021

eXPerience

ISDB-T 20 countries



Those countries which are facing the risk of natural disasters（Peru, Central American countries etc.) have strong interest in EWBS introduction and expect a technical assistance from Japan.

About DiBEG

https://www.dibeg.org

DiBEG
Digital Broadcasting Experts Group

Purpose

Digital Broadcasting Experts Group (DiBEG) was founded on September 1997 to promote ISDB-T, the Japanese Digital Terrestrial Broadcasting System, in the world. And also, DiBEG promotes the exchange of technical information and international cooperation to facilitate common understanding for ISDB-T in the world.

Activities

- Research of the trend toward digital broadcasting in the world.
- Exchange of digital broadcasting technologies and facilitation of common understanding.
- Technical assistance for the countries where ISDB-T has been adopted.

Members (17)

- ACCESS CO., LTD.
- FUJI TELEVISION NETWORK, INC.
- Hitachi Kokusai Electric Inc.
- Japan Broadcasting Corporation (NHK)
- Japan Telecommunications Engineering and Consulting Service (JTEC)
- MASPRO DENKOH CORP.
- NEC Corporation
- NHK Technologies, Inc.
- Nippon Television Network Corporation
- Panasonic Corporation
- Sharp Corporation
- Sony Corporation
- TV TOKYO Corporation
- TOKYO BROADCASTING SYSTEM, INC
- TOSHIBA CORPORATION
- TV Asahi Corporation
- YACHIYO ENGINEERING CO., LTD.

Authors

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- *Seiji SAKUMA : Senior Researcher, ISDB-T Promotion Group, ARIB (Association of Radio Industries and Businesses)*

Outline

DiBEG
Digital Broadcasting Experts Group

1. *Advantage of EWBS with ISDB-T*
2. *Technical requirements on EWBS in Latin American countries*
3. *Development of "EWBS Superimpose Dissemination System"*
4. *Current Status of EWBS Implementation in Latin American Countries*

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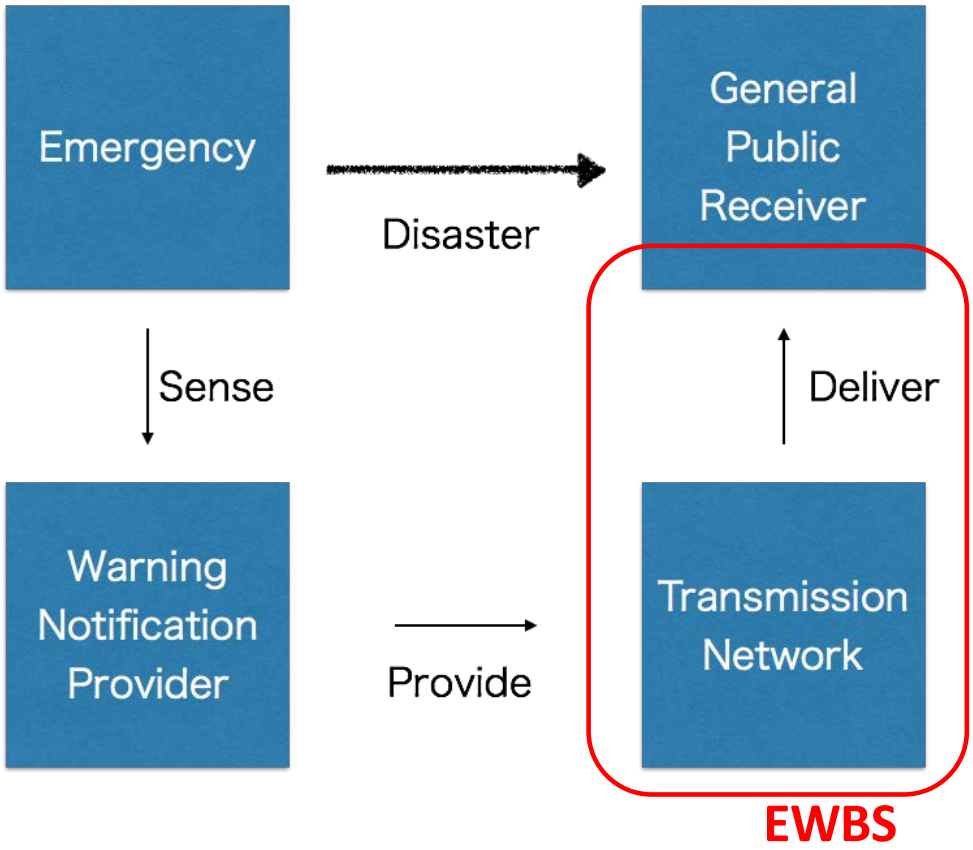
EWBS ecosystem & requirements



- Mass delivery
- Rapidity
- Understandability
- Universality
- Usability
- Reliability

equals to “Advantage of ISDB-T”

Why emergency information on broadcast network?

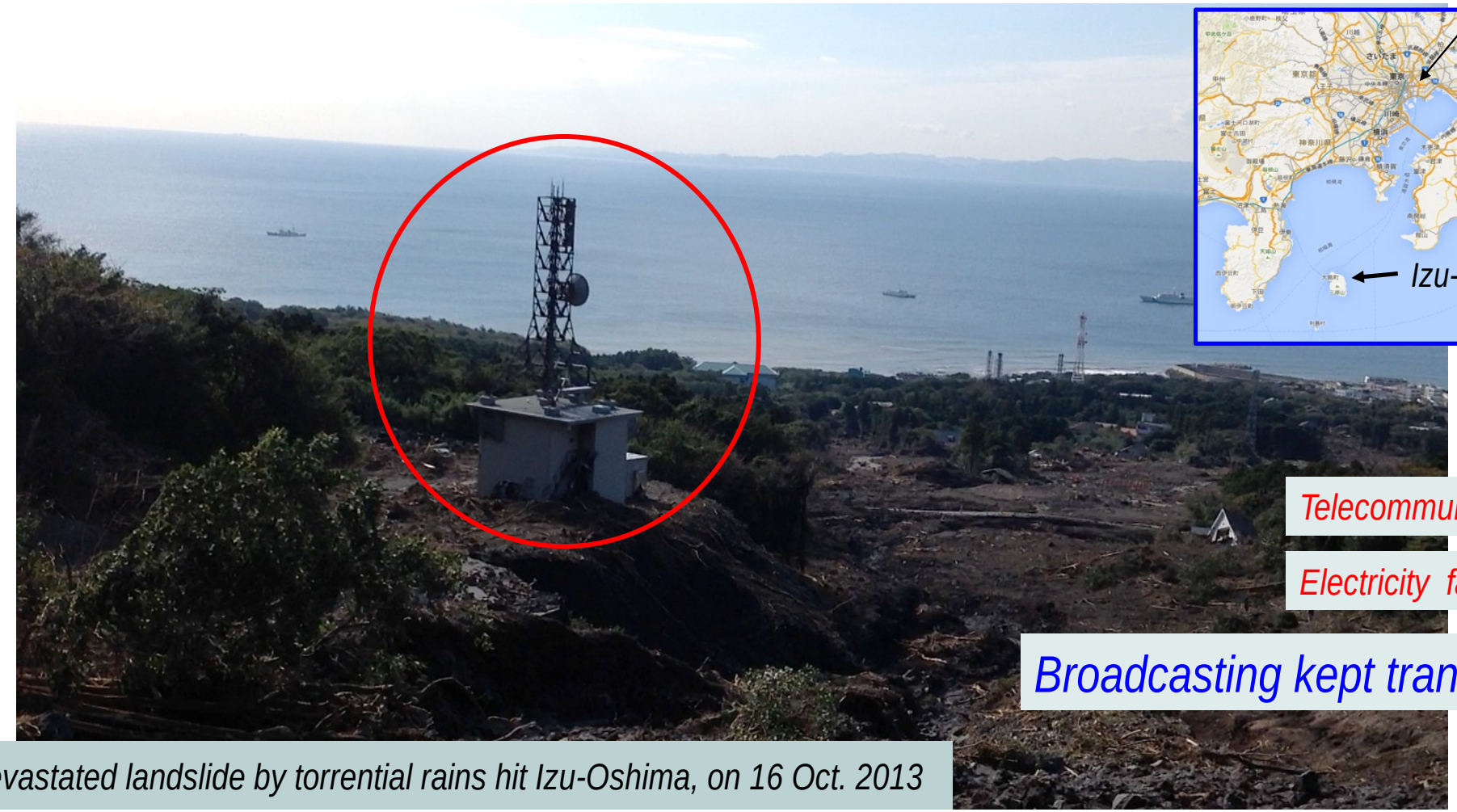
- *One-way transmission*

  Traffic Congestion-free, Resistant to cyber security

- *Robust transmission*

- *More coverage at remote place*

Broadcast - Robust Transmitting Station



Telecommunication failed

Electricity failed

Broadcasting kept transmission !

Devastated landslide by torrential rains hit Izu-Oshima, on 16 Oct. 2013

Broadcast - more coverage at remote place

In case of Peru--

Remote place

Populated place

Broadcast Network

250 transmitting stations

more than 2,000 relay transmitting stations

Wide coverage to every corner of the nation

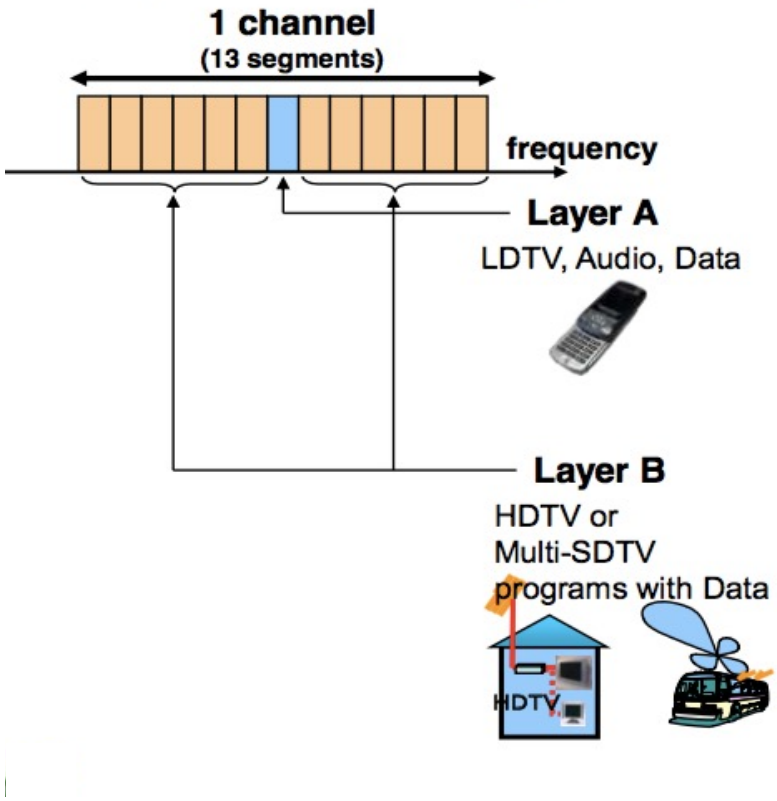
Cellular Network

not complete

ISDB-T Hierarchical Transmission

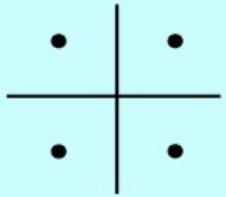
Example

(2 layers transmission)



Layer A

Handheld reception (One-Seg service)



QPSK
FEC=2/3

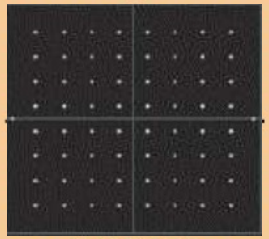
For handheld service

Robust transmission mode

One-Seg

Layer B

Fixed reception, Mobile reception (HDTV,etc)



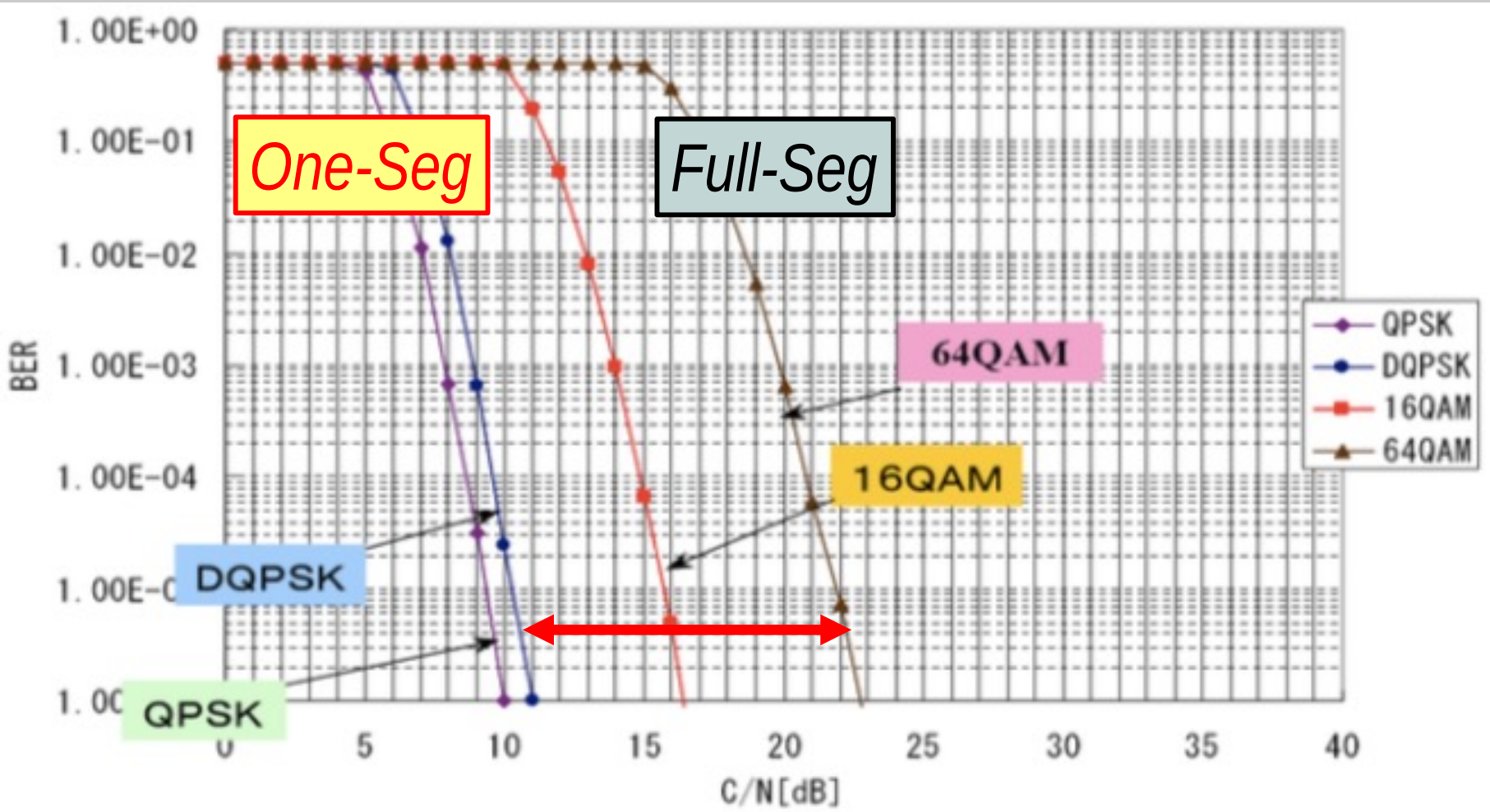
64QAM
FEC=3/4

For HDTV or Multi-SDTV service

High capacity transmission mode

Full-Seg

Robust “One-Seg” Transmission



C/N reception condition : “One-Seg” has more than 10dB better than “Full-Seg”

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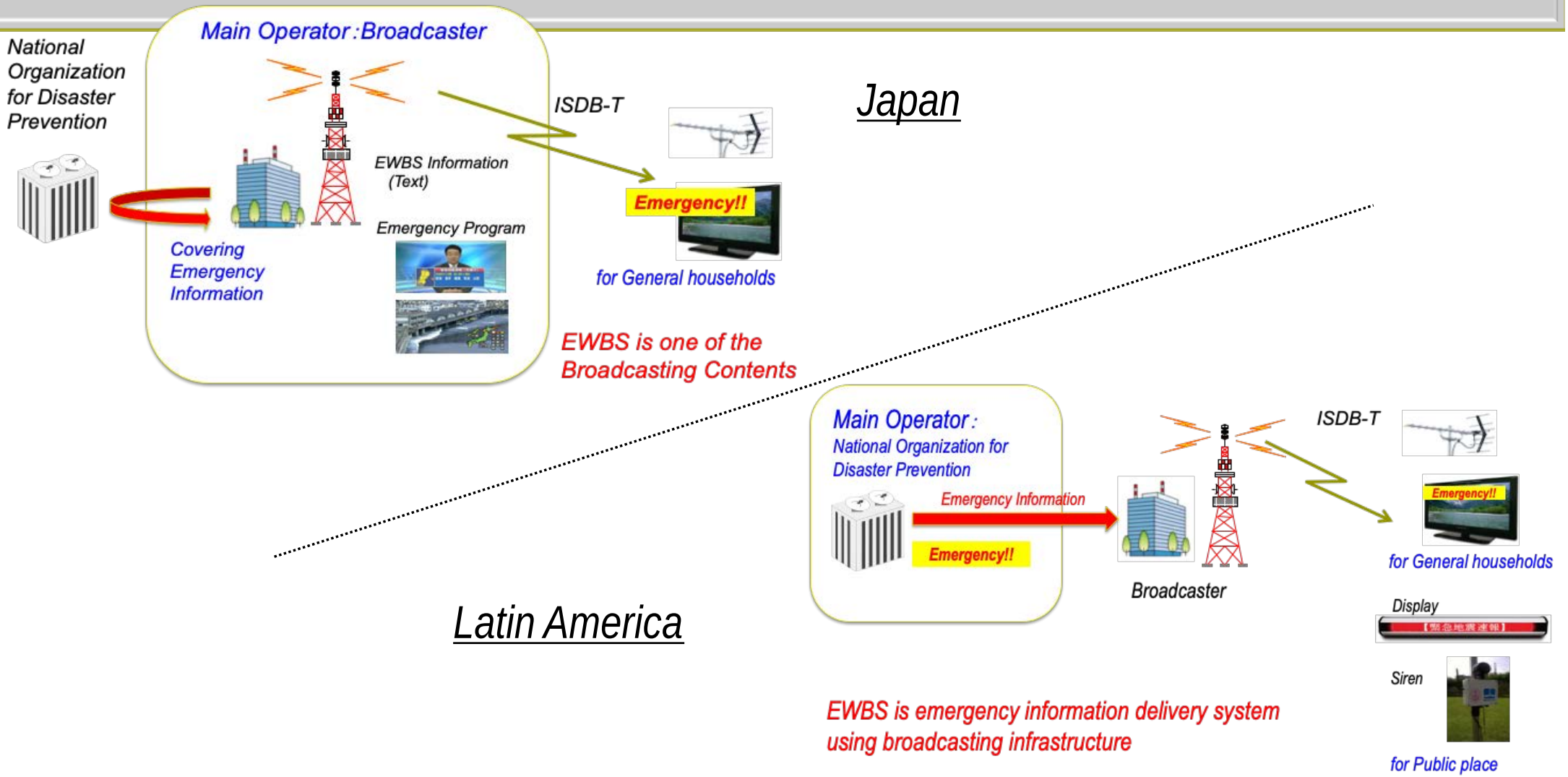
Differences in requirements on EWBS

	Japan	Latin America
Main Operator	Broadcasters (all)	Government (National Organization for Disaster Prevention)
Concept of using broadcast radio waves	Means of delivering "broadcasters' contents"	Means of delivering "national disaster prevention information"
Target Areas	ⓐ Nationwide ⓑ Regional areas	ⓐ Nationwide, ⓑ Regional areas ⓒ Local areas
Information disseminated	ⓐ Early warning	ⓐ Early warning ⓑ Information after the occurrence (Post-event information)
Target recipient	TV Viewers in general households	Public places (offices, firefighting stations, hospitals, etc.) and general households
Type of receivers	TV receivers for home use	Various receivers for public / home use ・Public signage / sirens, etc. ・TV receivers for home use

Difference in EWBS Operation between Japan and Latin America



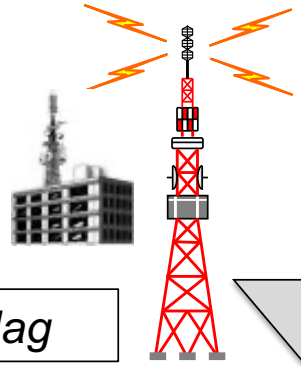
Requirement of EWBS local operation

At a TV Transmitting Station in Peruvian Andes. This is a district where 20,000 people died of drowning by devastating glaciers flooding caused by the 1970 earthquake.

In the future, digitization and EWBS operation will contribute to the Local specific disaster prevention.

EWBS Standardization in ISDB-T International Forum

Broadcasters



Activation Flag

Superimpose

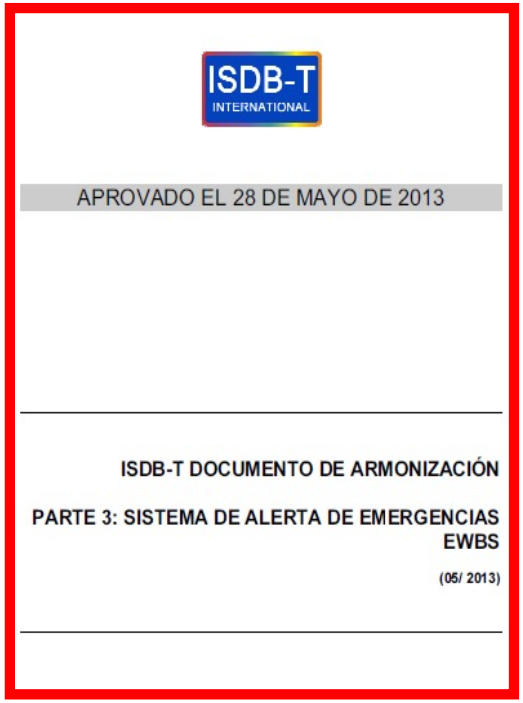
Receivers

Automatic activation by Activation Flag

Emergency Information Display by Superimpose

Adding a "Superimpose" function on the Japanese original, EWBS Standard was approved by ISDB-T International Forum in May 2013

EWBS Harmonization Document
By ISDB-T International Forum



ISDB-T INTERNATIONAL

APROVADO EL 28 DE MAYO DE 2013

ISDB-T DOCUMENTO DE ARMONIZACIÓN

PARTE 3: SISTEMA DE ALERTA DE EMERGENCIAS EWBS

(05/ 2013)

EWBS Standardization in ISDB-T International Forum

	ARIB / Japan	Harmonization Document (EWBS)
EWBS	Standard STD-B31 (TMCC) STD-B10 (PMT) Operational Guideline TR-B14	Superimpose is used for emergency information delivery in EWBS operation.
Superimpose	Standard STD-B24 Operational Guideline TR-B14	

What is "Superimpose" ?

3 Types of text messages used in TV service

Overlay in Broadcasting Studio

（1）Normal Subtitle (Open Caption)

- Information which belongs to the main program
- Always on *the display*

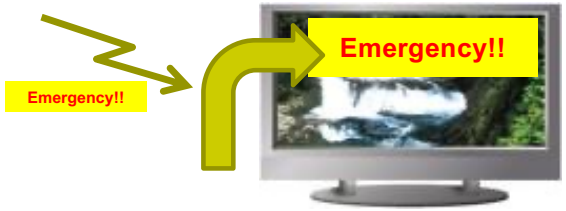
（2）Closed Caption

- the service for inaudible persons / multilingual movie etc.
- Synchronous information with the main program
- Selection of display (on/off) by viewers

（3）Superimpose

- Asynchronous information with the main program
- Selection of display (on/off) by viewers
- to be sent background at any time

Overlay in Receivers



What is “Superimpose” ?

Superimpose

overlay in receivers

Open-Caption

On 14:46 March 11,2011 NHK’s Broadcasting

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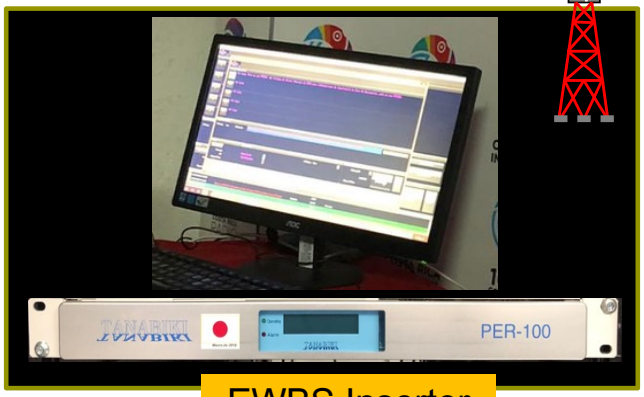
EWBS Superimpose Dissemination System

for Latin American countries



EWBS Inserter

Robust

ISDB-T

One-seg

EWBS-Superimpose Module

Display EWBS

EWBS STB

EWBS Gateway

Ethernet HUB

Broadcast Alart

Wifi accesspoint

Siren ♪ "EWBS"
Siren ♪ "EWBS"
Siren ♪ "EWBS"

- Compliance to EWBS Harmonization document
  Compliance to "Superimpose" on ARIB Standard
- Efficient dissemination with maximum use of exiting infrastructure

EWBS Superimpose Dissemination System

for Latin American countries

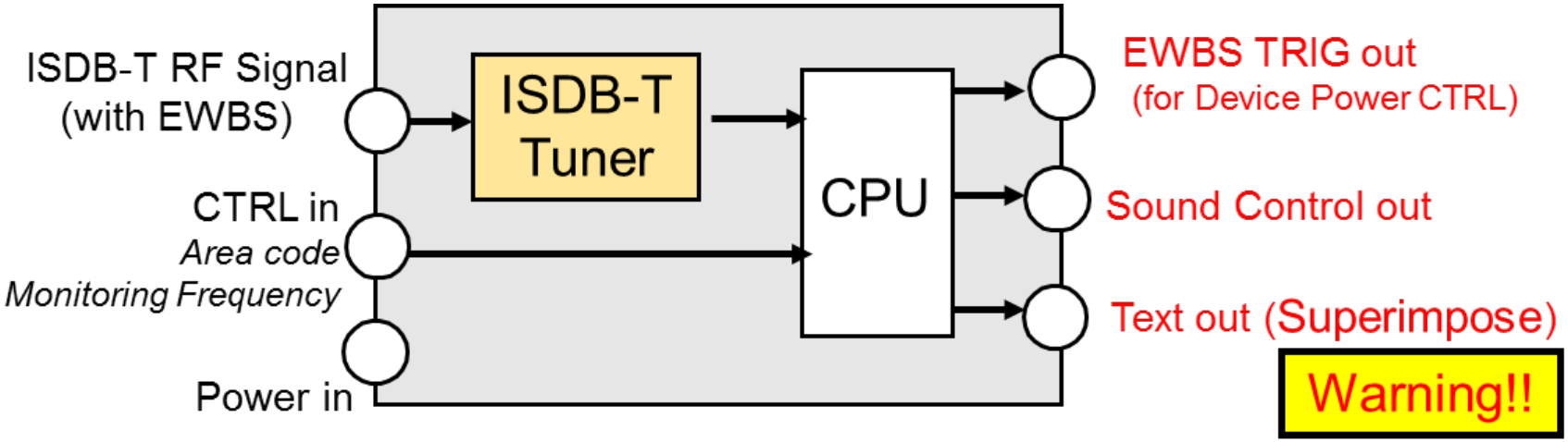
Simple installation
Simple operation

Robust
Reliable

Wide coverage
Both for Nationwide / Local information

EWBS Superimpose Module

- Exclusive reception of Text Information
- 24-hour monitoring ⇒ never to miss EWBS alert
- Robust “One-seg” reception
- Small size , Low consumption



EWBS Superimpose Module

Public Display

for Public Use

for Consumer Use

EWBS-Superimpose Module

Alert Terminal

Portable TV

STB

TV

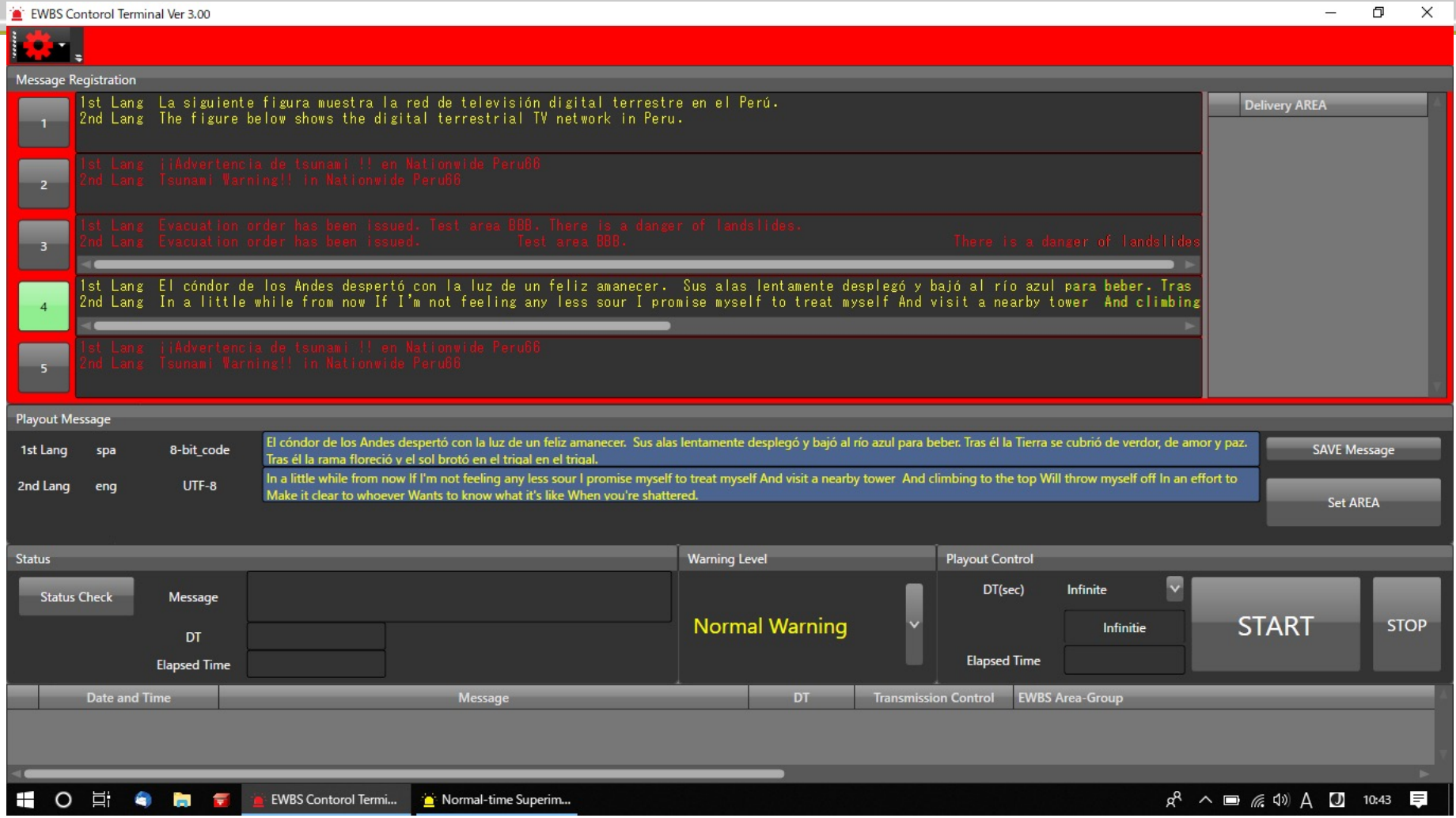
Public Speaker / Siren

Application of operation controlled by EWBS Inserter

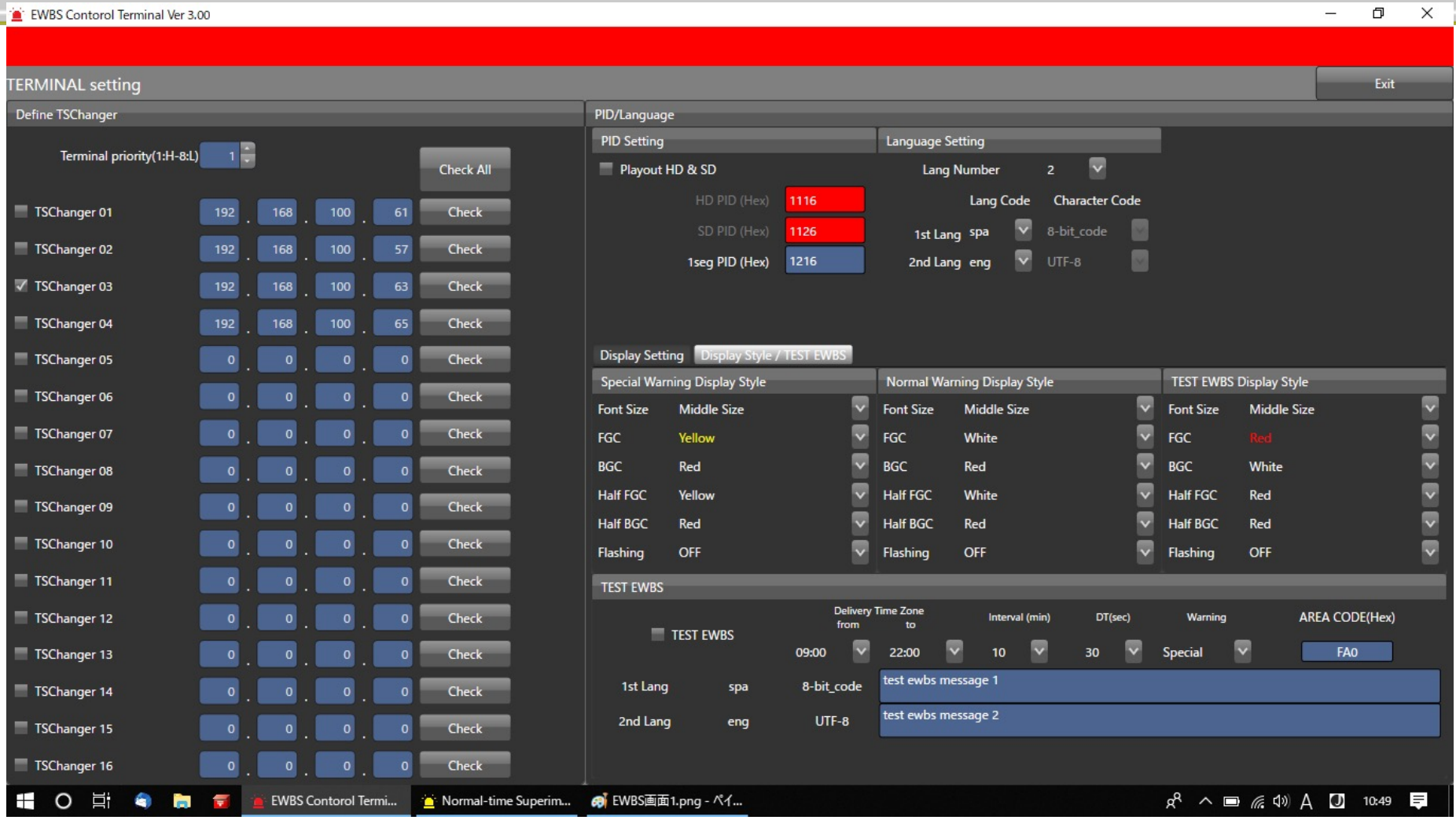
			Siren for TSUNAMI	Signage	TV
1	Tsunami Alert N	~~Full-seg~~ One-seg		TSUNAMI Alert	TSUNAMI Alert
2	Local Alert L	~~Full-seg~~ One-seg		Local Alert	Local Alert
3	Test for Designated receiver L	One-seg	♪	Equipment test	Equipment test
4	Drill N L	One-seg	♪	Disaster Drill ♪	
5	Important Notification N L	One-seg		Heavy Rain ! ♪	
6	General Information N L	One-seg		Weather Info.	

N: Nation wide Operation L: Local Operation

EWBS transmission control terminal (operation menu)



EWBS transmission control terminal (configuration menu)



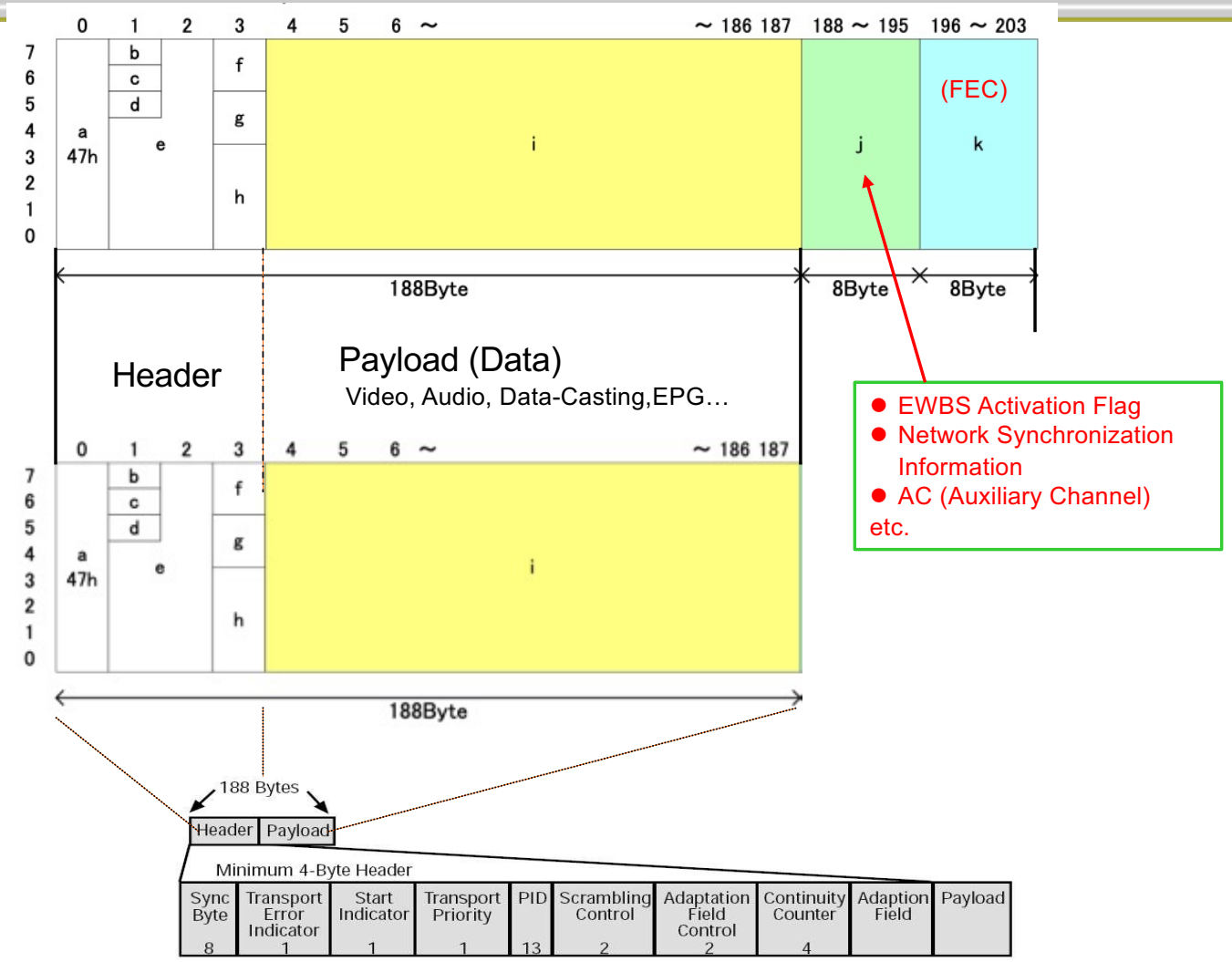
Options of TS signal Distribution

BTS
(for ISDB-T)

204Byte

188Byte-TS
(for DVB)

188Byte

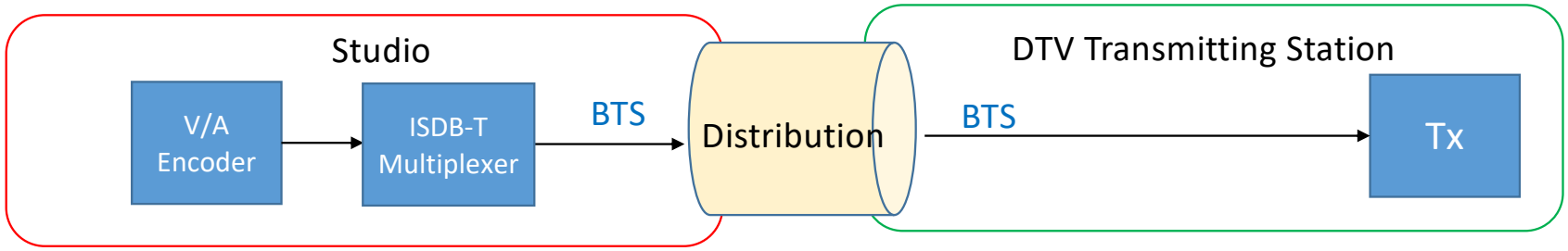


- EWBS Activation Flag
- Network Synchronization Information
- AC (Auxiliary Channel)

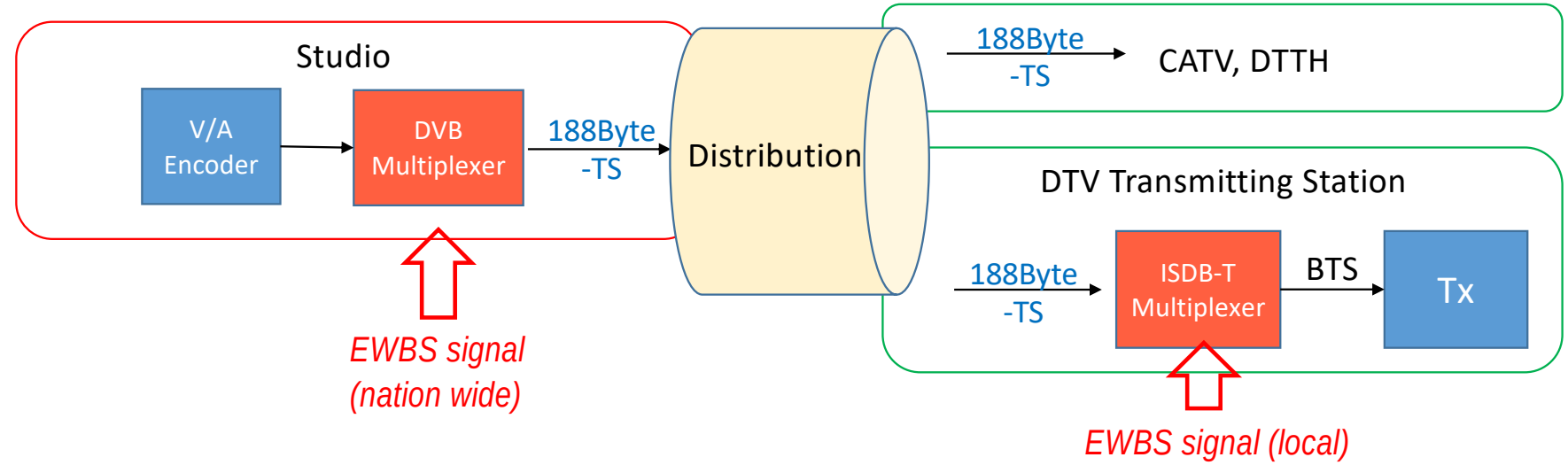
etc.

EWBS signal transmission system that supports DVB distribution

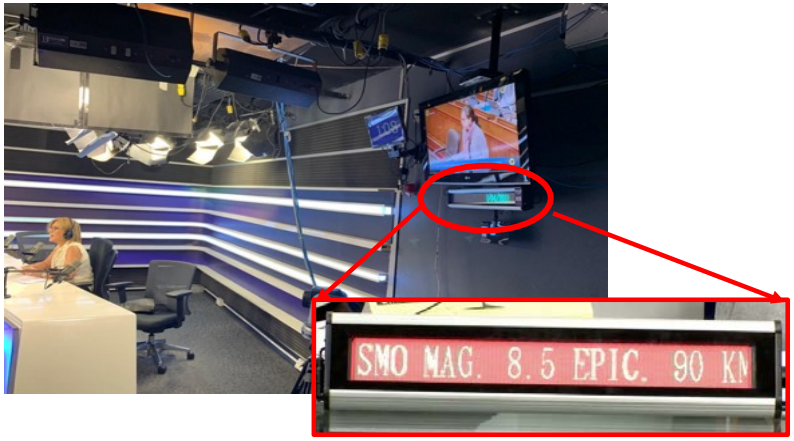
BTS Transmission (for ISDB-T operation)



188Byte-TS Transmission (for DVB operation)



EWBS Signage Display



EWBS display in operation
at a radio station in Lima, Peru

- These terminals are intended to be installed in public space where people are grouped, such as government offices, fire stations, shopping centers and any other place where disaster prevention is required.

- Displays is used for the dissemination of information after the disaster ("Post-event information"). As an example of this use, the display can be installed in an evacuation center, providing daily survival information to evacuees, such as state of restoration of living conditions, volunteer activities, etc.

EWBS compatible Set Top Box

Automatic activation
Automatic HDMI port change over TV-set

HDMI CEC function

ISDB-T
"One-seg"

EWBS STB

Separate EWBS dedicated tuner

"never misses the alarm"

Result of HDMI – CEC compatibility test in Costa Rica (March 2019)

No.	Marca	Lugar de fabricacion	Fabricante	Modelo	Cambio de entrada	Encendido automatico								Obser
						HDMI 1		HDMI 2		HDMI 3		HDMI 4		
1	SONY	Mexico	SONY	XBR-55A1E	OK	ON		ON		ON	ARC	ON		Este se usao para hacer la demos con EWBS y las otras funciones.
2	SONY	Mexico	TrandsmartCE Mexico	KD-55X725F	OK	ON		ON		ON	ARC			
3	SONY	Mexico	FOXCOONN	XBR-70X835F	OK	ON		ON		ON	ARC	ON		
4	SAMSUNG	Mexico	SAMSUNG Mexico	QN65Q7FAMPX	OK	ON		ON	ARC	ON		ON		
5	SAMSUNG	Mexico	SAMSUNG Mexico	UN50NU7090P	OK	ON		ON	ARC					
6	LG	Mexico	LG Mexico	OLED65B8SSC	OK	ON		ON	ARC	ON		ON		
7	LG	Mexico	LG Mexico	43UK6300PSB	OK	ON		ON	ARC	ON				Tenia la función HDMICEC desactivada pero aun asi encendi
8	LG	Mexico	LG Mexico	49LH5730-SE	OK	~~ON~~	ARC	~~ON~~						Se fabricó en Septiembre del 2016 . Tenia la función HDMICE desactivada pero aun asi encendió
9	TELSTAR	China		TTK065440KK	OK	~~ON~~		~~ON~~		~~ON~~	ARC			fabricado en 2018
10	TELSTAR	China		TTS043740KS	OK	ON		ON		ON				sin ARC
11	TELSTAR	China		TK043420KK	OK	~~ON~~		~~ON~~		~~ON~~		~~ON~~		fabricado en 2018 sin ARC
12	Panasonic	Mexico	Panasonic Mexico	TC-32D400L	OK	~~ON~~		~~ON~~	ARC					Fabricado en 2017
13	Haier	China		LE55D8500DA	NG	~~ON~~		~~ON~~		~~ON~~				sin ARC
14	Westinghouse	China		W50L165SM	NG	~~ON~~		~~ON~~		~~ON~~				sin ARC
15	RCA	China		RC24A165	NG	~~ON~~								sin ARC
16	LG	China	LG Mexico	LG32U500B	NG	~~ON~~		~~ON~~						sin ARC
17	LG	China	LG Mexico	49LH5100	NG	~~ON~~		~~ON~~						sin ARC

Major manufactures' TV-set are almost compatible HDMI-CEC function

Applications of “EWBS Gateway”

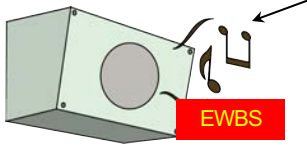
Bridge of EWBS to any existing communication systems

Siren

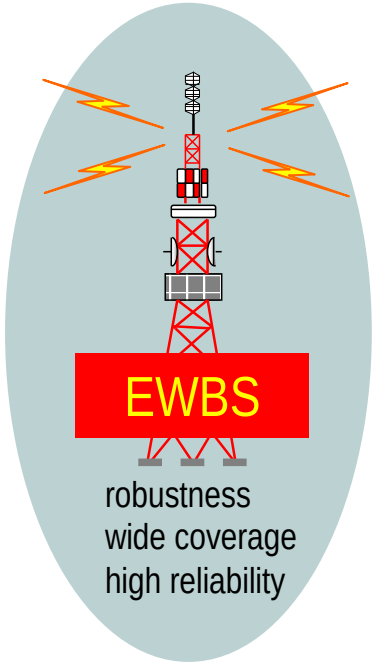
Public Communication System

EWBS Gateway

Speaker

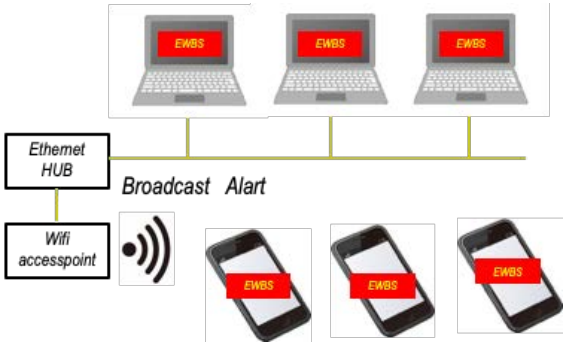


Signage

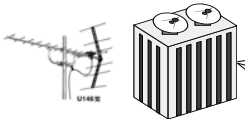


WiFi

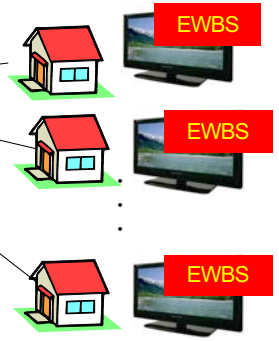
EWBS Gateway



CATV



EWBS Gateway



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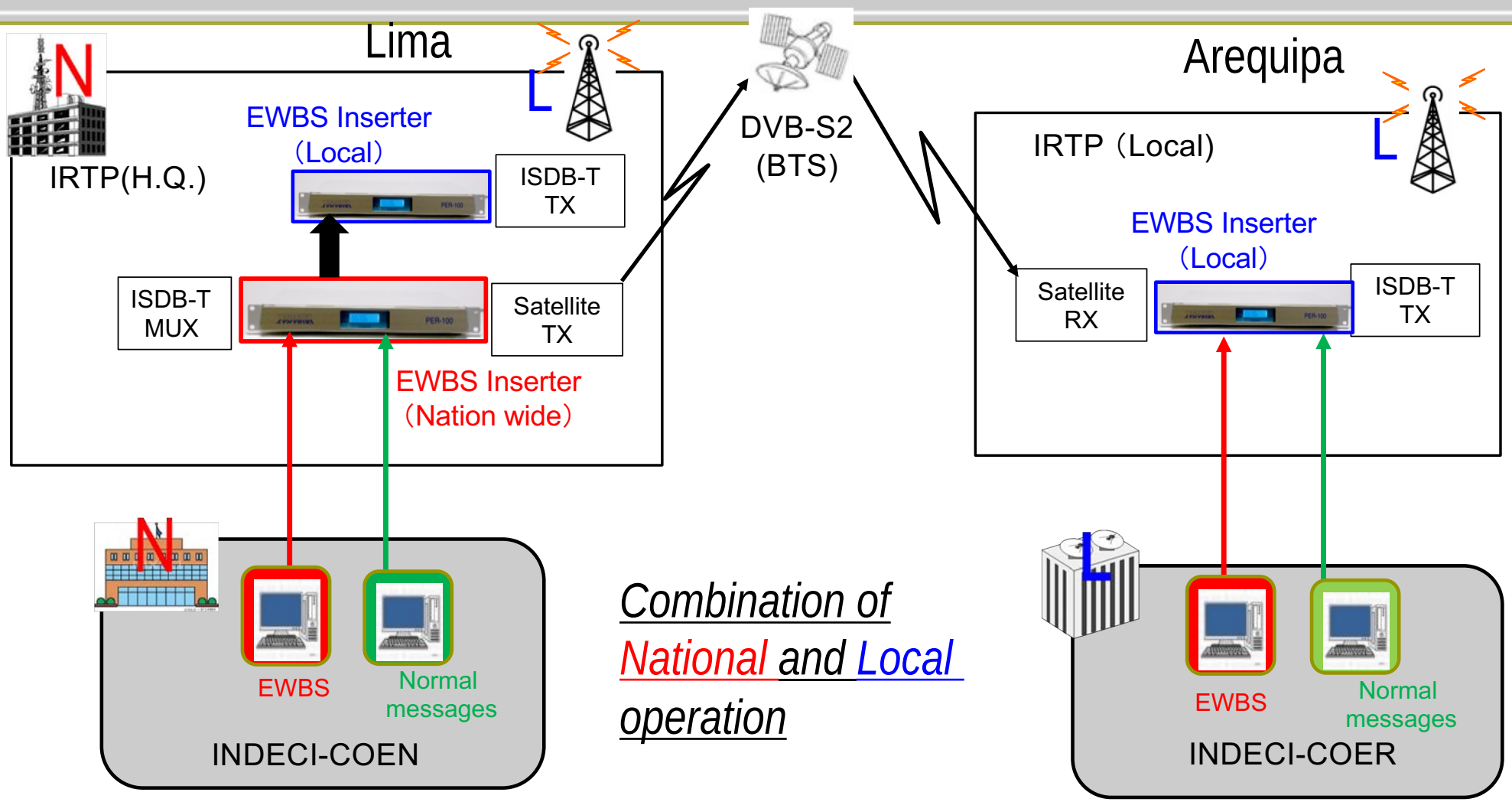
eXPerience

EWBS implementation in Latin America with Japan's cooperation

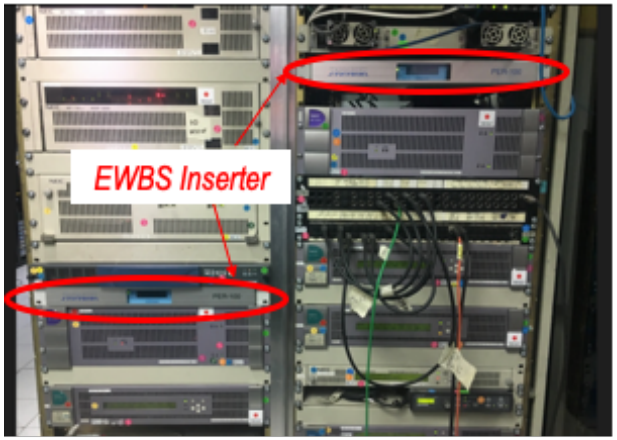
Nicaragua	3/2018 Field trial of hardware 4/2021 Start of EEW(Earthquake Early Warning) test transmission
El Salvador	10/2018 Field trial of hardware 10/2019 Start of trial operation by national organization for disaster prevention, and support for reception tests 4/2021 Start of EEW(Earthquake Early Warning) test transmission
Costa Rica	10/2018 Field trial of hardware 3/2019 Start of trial operation by national organization for disaster prevention, and support for reception tests 4/2021 Start of EEW(Earthquake Early Warning) test transmission
Peru	1/2019 Field trial of hardware 3/2019 Start of support for operation training 11/2019 Tested in a large-scale evacuation test on World Tsunami Awareness Day
Brazil	12/2019 Field trial of hardware
Ecuador	3/2021 Indoor-test of hardware

EWBS operation in Peru



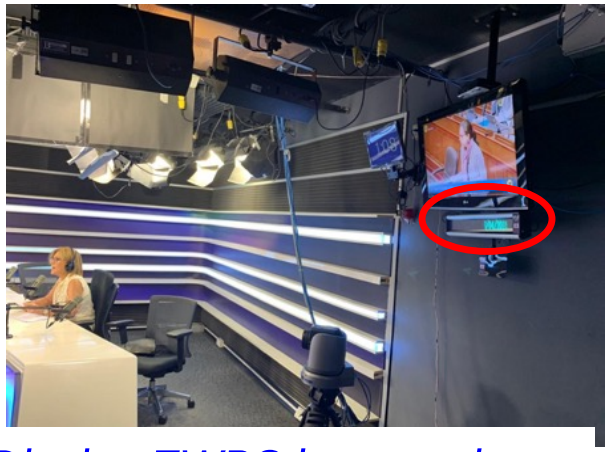
Combination of National and Local operation

EWBS operation in Peru



IRTP (Lima)

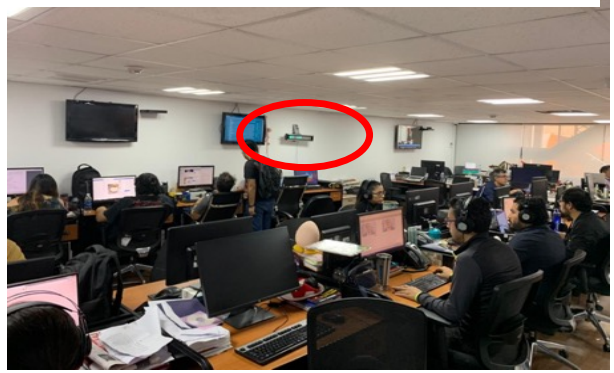
INDECI-COEN (Lima)



Display EWBS in operation
in Radio broadcasting station

IRTP (Arequipa)

INDECI-COER (Arequipa)



Peru - EWBS utilized in the event on “World TSUNAMI Awareness day”

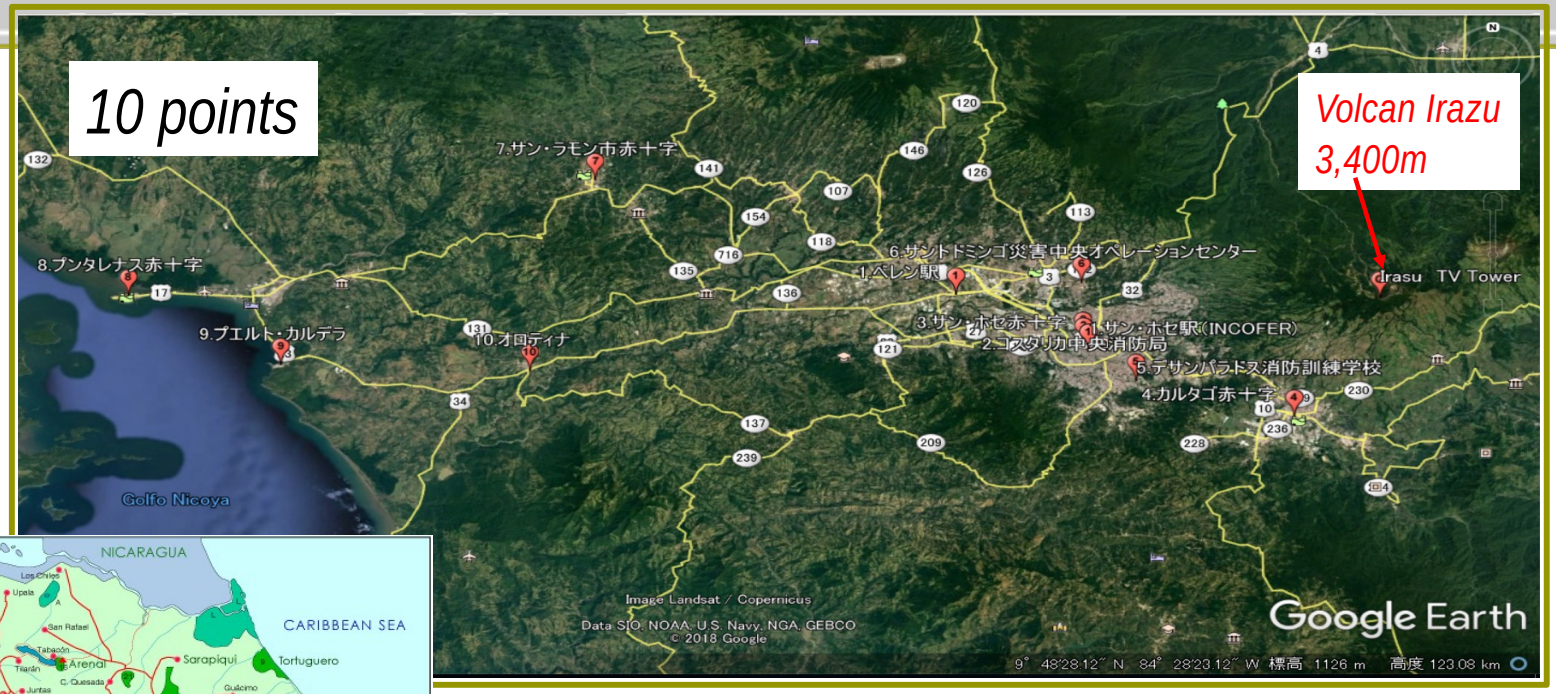
5 November 2019

Emergency message (EWBS) displayed on the large display at the main site of the evacuation drill

Utilization in a local government

EWBS Displays utilized in the Disaster Ministerial meeting

EWBS Reception Survey in Costa Rica (March 2019)



Results of reception

Reception level	30	26	20	18.5	17	15.5
MER (dB)	26	22	15	13	10	7.5
STB	✓	-	-	-	-	-
Display EWBS	✓	✓	✓	✓	✓	✓

EWBS Reception Survey in Costa Rica (March 2019)

Field test at a fire station

Field test in a vehicle

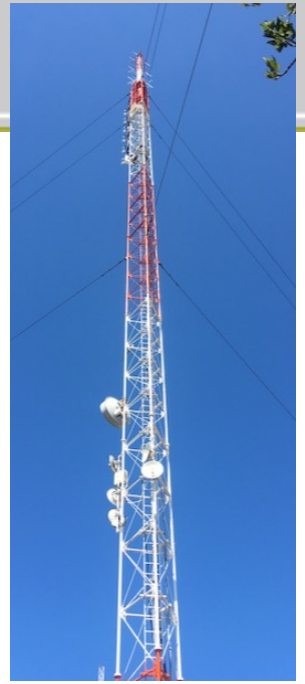
Field test in a coast guard boat

Field test in a railway carriage

EWBS Experiment in Nicaragua (March 2018)

SINAPRED

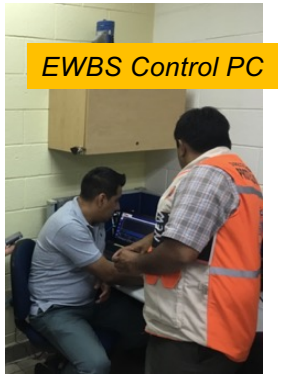
EWBS Control PC



Canal 6

EWBS Inserter

EWBS Experiment in El Salvador (October 2018, October 2019)



EWBS Control PC

Protección de Civil

Canal 10

EWBS Inserter

EWBS receiver installation at a government agency

Demonstration in Evacuation drill

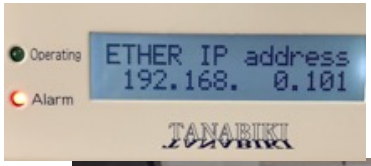
Reception in a moving vehicle

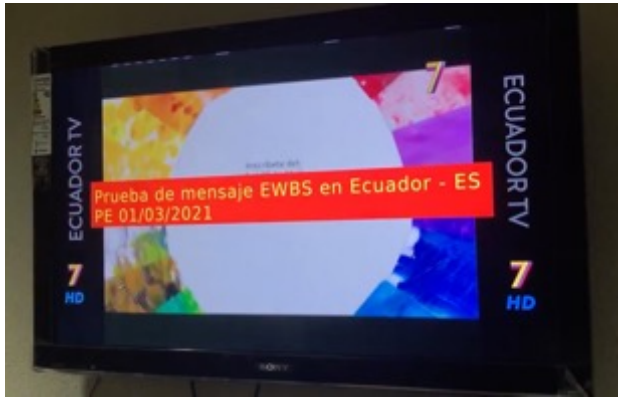
EWBS Experiment in Brasilia (December 2019)

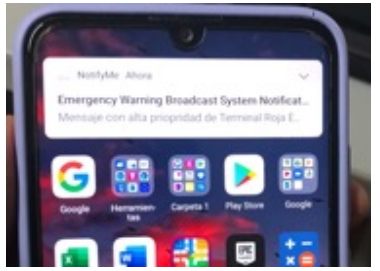
EWBS Inserter installed public broadcasting station, EBC

CENAD ; Brazilian National Risk and Disaster Management Center

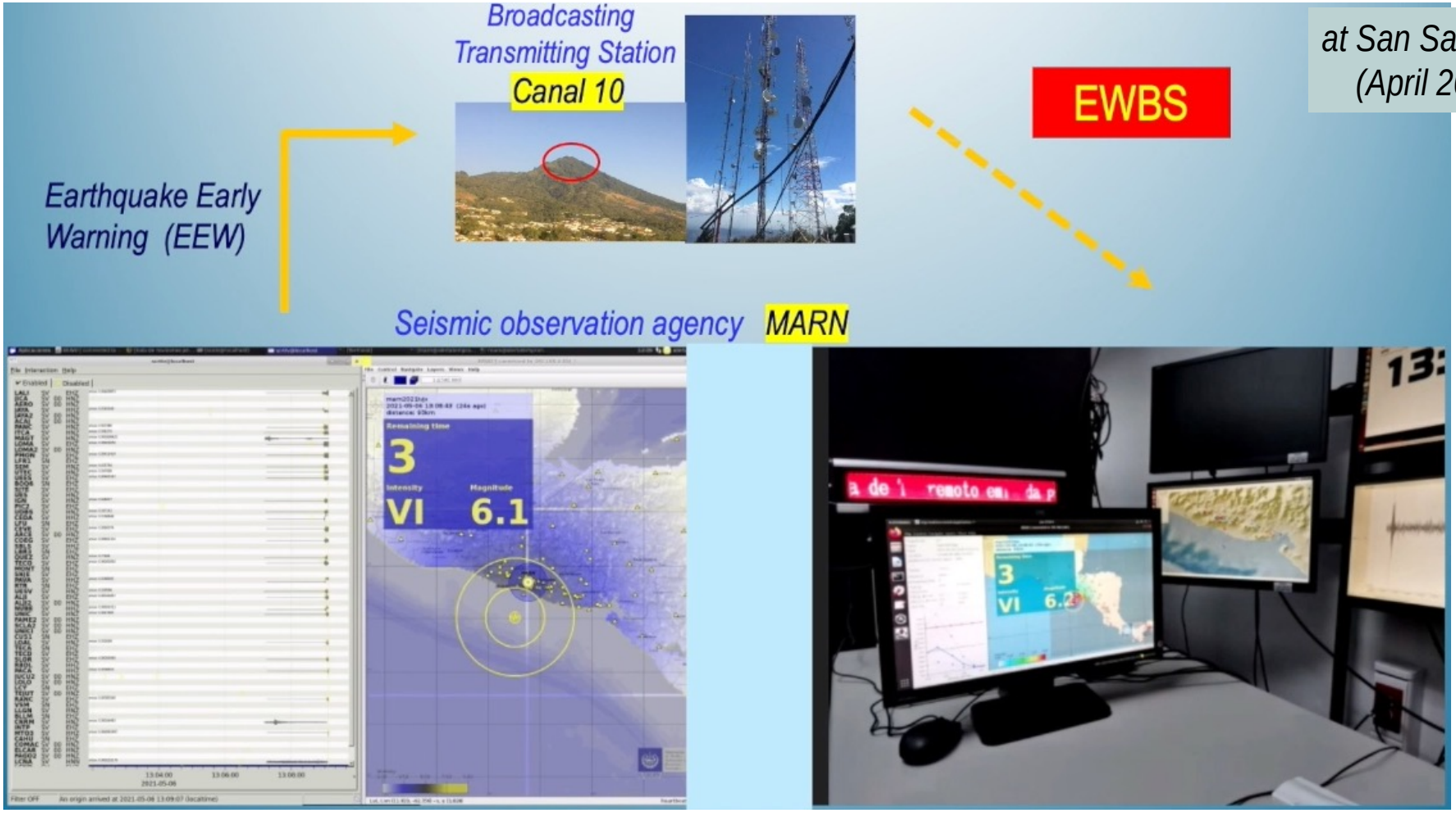
EWBS Experiment in Ecuador (March 2021)







EWBS trial disseminating Earthquake (EEW) information in Costa Rica, El Salvador and Nicaragua



Conclusion

- *The EWBS in these Latin American countries presents a different operational style from Japan. For this reason, we have worked on technical development of "EWBS Superimpose Dissemination System" adapted to numerous local requirements.*
- *The system we have developed is being sequentially implemented and verified in Peru and other Latin American ISDB-T adopting countries, and we are continuing our technical support and cooperation for stable and reliable system operation.*
- *In the near future, we strongly expect that collaboration between Japan and Latin American countries will standardize and unify the most suitable systems, and that devices will be launched and developed in the market, leading to the permeation of EWBS, which eventually would lead to the contribution to disaster prevention and mitigation.*

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- *We are grateful to the SBTVD-Forum, Brazil, for cooperative study as well as to all those people in Latin American ISDB-T adopting countries, who have been extending extensive understanding and cooperation to us for our activities.*