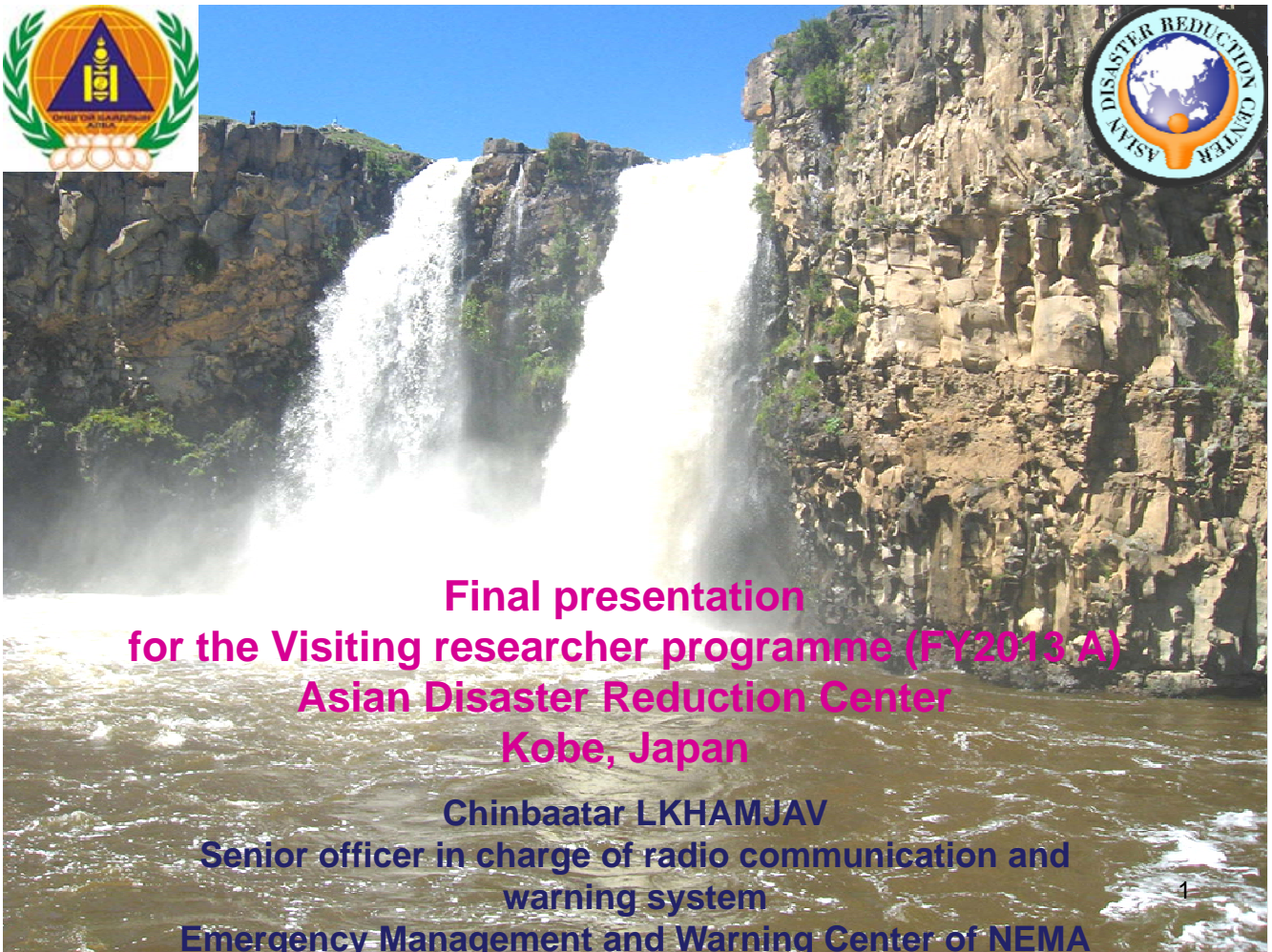


## **Disclaimer**

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The views expressed in the report do not necessarily reflect the views of the ADRC. The boundaries and names shown and the designations used on the maps in the report also do not imply official endorsement or acceptance by the ADRC.



**Final presentation  
for the Visiting researcher programme (FY2013 A)  
Asian Disaster Reduction Center  
Kobe, Japan**

**Chinbaatar LKHAMJAV  
Senior officer in charge of radio communication and  
warning system  
Emergency Management and Warning Center of NEMA**

1

## **Outline of presentation**

- 1. Information and communication system in Mongolia**
- 2. Disaster early warning system in Mongolia**
- 3. Disaster early warning system in Japan**
- 4. Disaster information and communication in Japan, Tohoku earthquake March 2011**
- 5. Planning of disaster early warning system**

2

# 1. Information and communication system in Mongolia

3

## Telecommunication

“Telecom Mongolia” is the national telecommunications company of Mongolia that provides a wide range of telecommunication product offerings such as internet services, cable TV networks, radio and TV broadcasting to Mongolian customers.

Main activities:

- Traditional telecommunication
- Next-generation network telecommunication
- F-zone wireless telecommunication
- Internet service provider

Area	2009	2010	2011	2012
Western	9,357	8,146	6,533	6,465
Khangai	15,800	14,630	12,969	11,748
Central	18,599	17,864	15,928	15,502
Eastern	4,221	3,686	3,239	2,979
Ulaanbaatar	94,885	98,867	93,135	112,696
<b>Total</b>	<b>142,862</b>	<b>143,193</b>	<b>131,804</b>	<b>149,390</b>

Figure 1. Number of telecommunication points  
Source: National Statistics Office of Mongolia

4

# Mobile communication

Two GSM system operators /Mobicom and Unitel LLC/ and two CDMA system operators /Skytel LLC and G-Mobile LLC/ are providing mobile communications services in Mongolia.

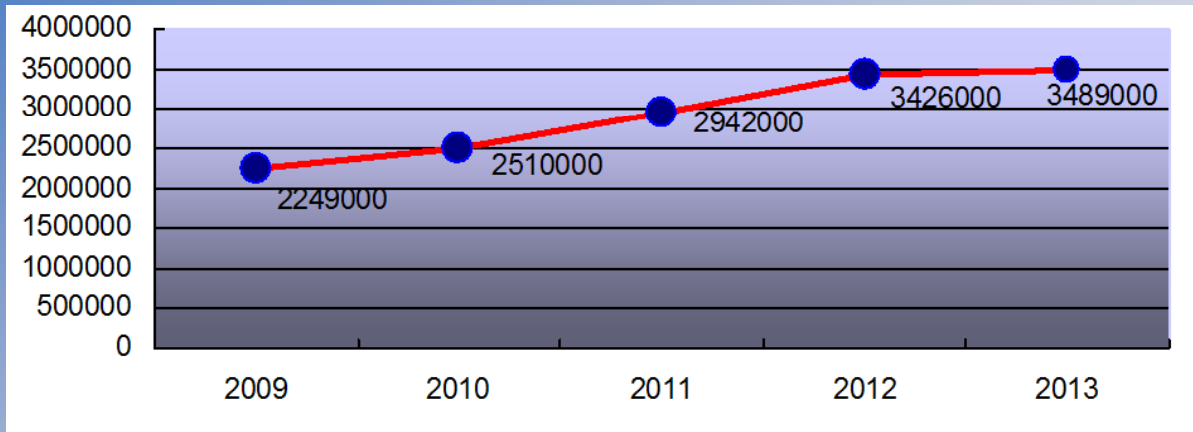
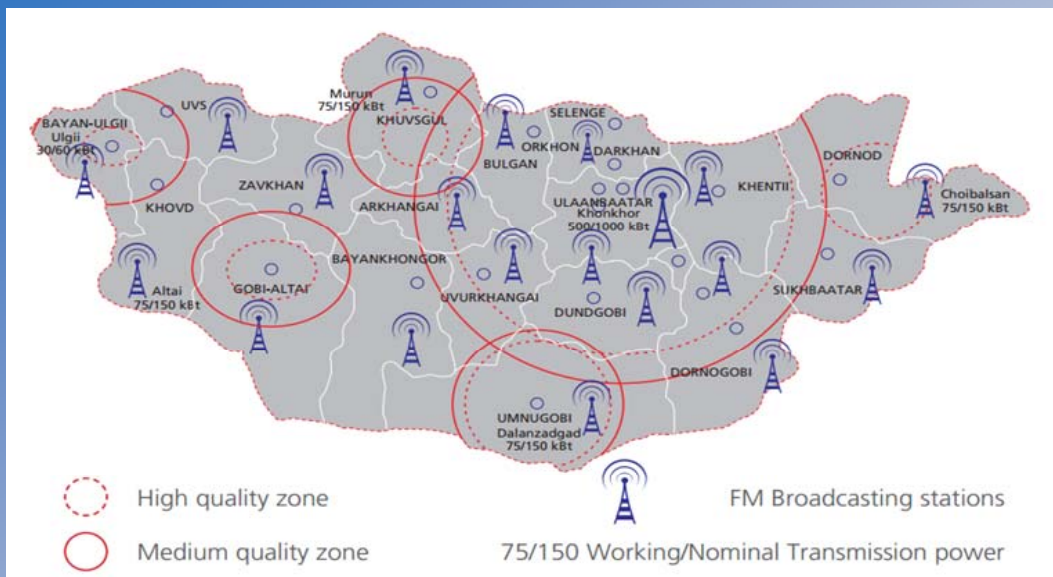


Figure 2. Number of mobile users in 2009-2013  
Source: National Statistics Office of Mongolia

# FM radio



More than 100 radio stations, including some 20 via repeaters for the public broadcaster as well as transmissions by multiple international broadcasters were available.

# TV broadcasting

TV broadcasting in Mongolia started in 1967, when the first national television program was aired in Mongolia.

There are 99 companies and organizations, which have television broadcasting licenses, including 70 companies to provide cable TV services.



Figure 4. Development of TV broadcasters in Mongolia

Source: Information Technology, Post and Telecommunication Authority of Mongolia <sup>7</sup>

## 2. Disaster early warning system in Mongolia

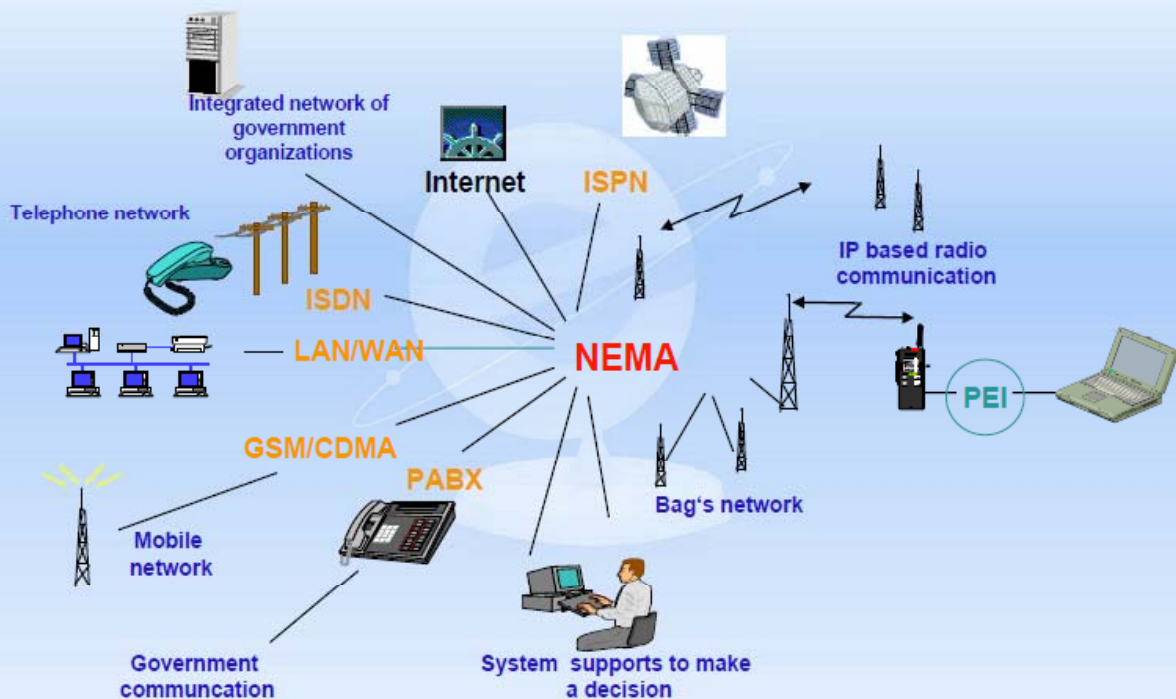
## Disaster communication system

National Emergency management Agency organizes every kind of communication.

- Early warning system
- Telecommunication system
- Radiocommunication network
- Satellite communication network
- Integrated network of state organization
- Integrated information data bases for disaster management

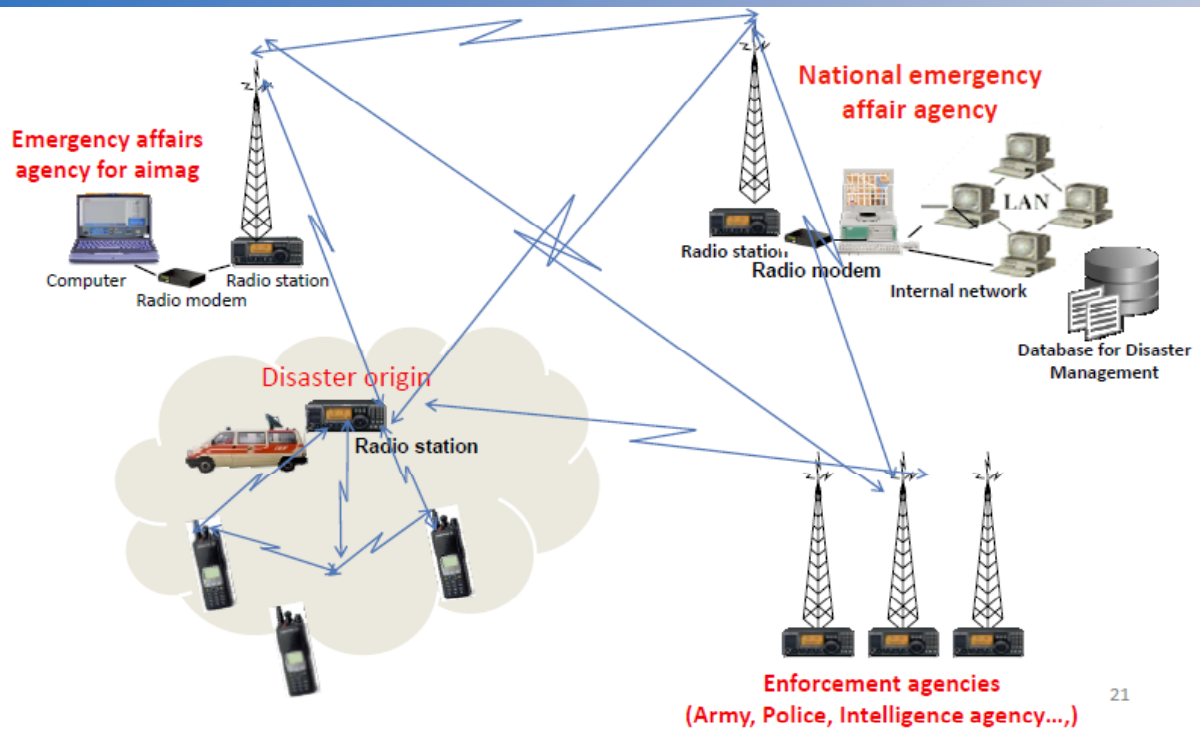
9

## Integrated network



10

# Radiocommunication network



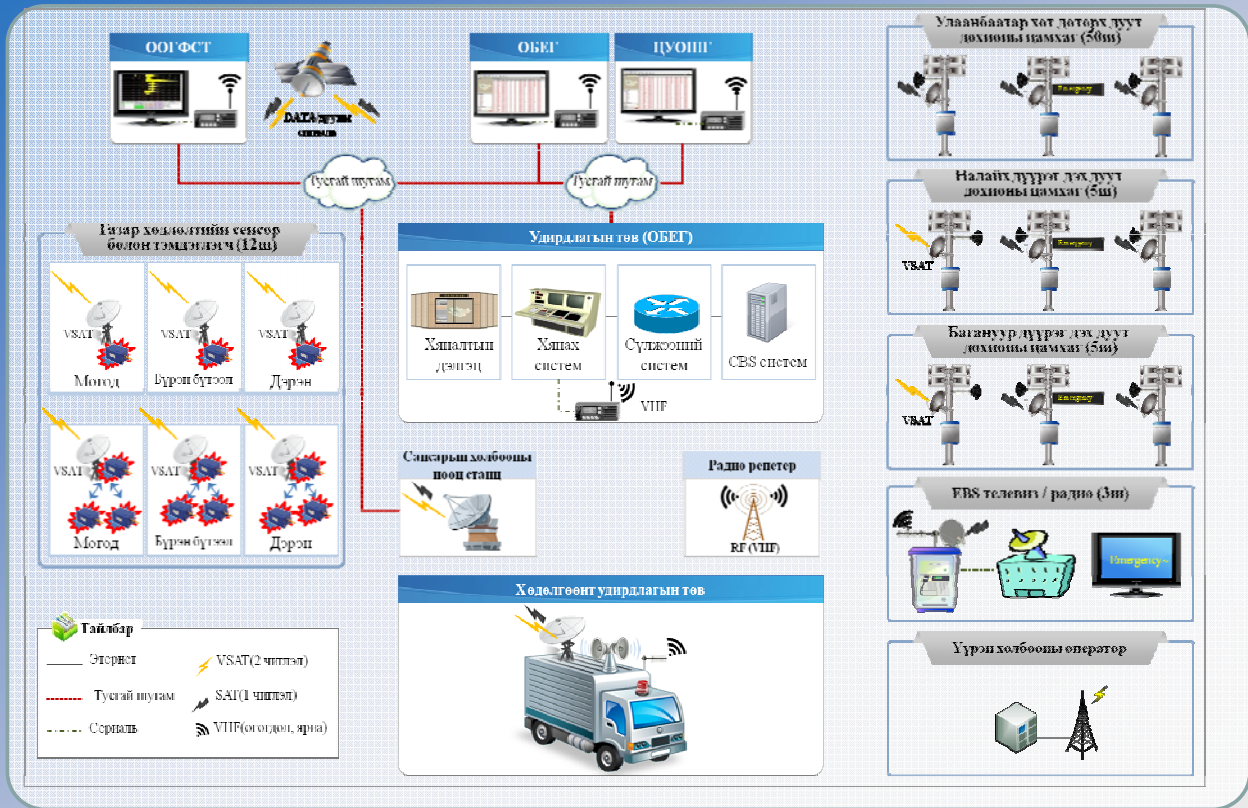
21

## Earthquake disaster warning system

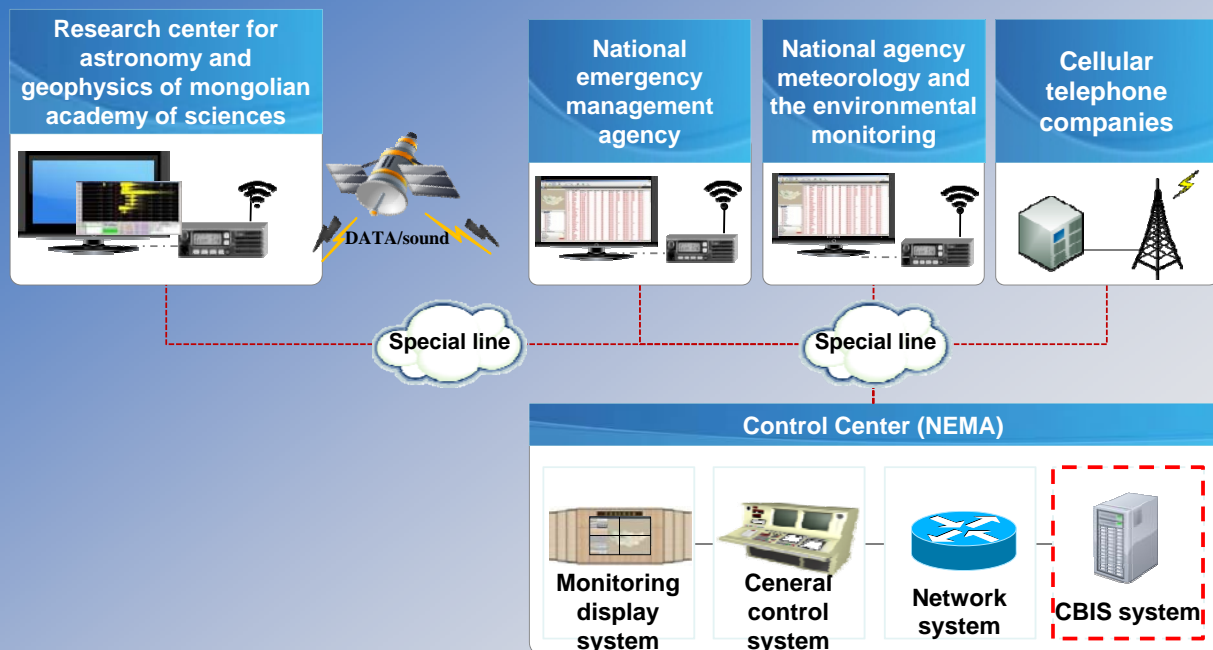
Mongolian government is co-implementing South Korean communications provider KT project of Earthquake Disaster Warning System (EDWS) in 2012-2014. The system will gather, process, and distribute information when disasters occur using wireless or wired connections. National Emergency Management Agency will also be able to send emergency SMS messages nationwide.

12

# General structure of earthquake disaster warning system

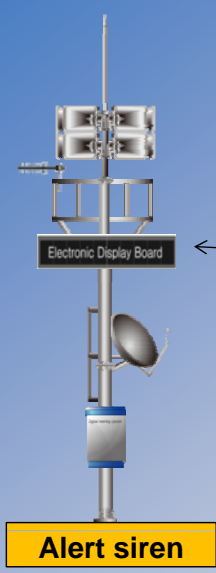


# CBIS /Cell broadcasting information server/ in Earthquake disaster warning system





# Earthquake disaster warning system



Alert siren

Emergency management and warning center



Cellular phone users

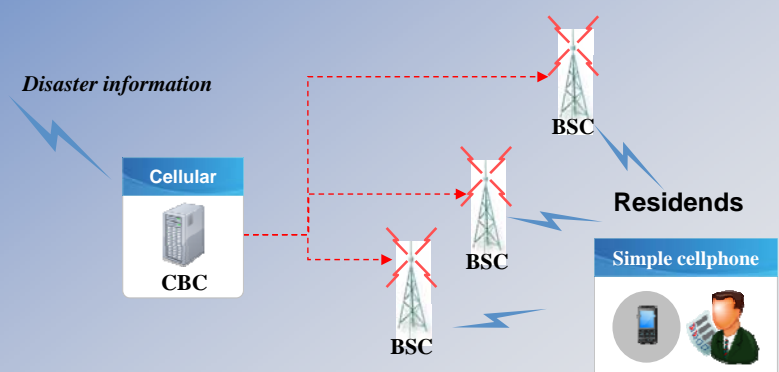
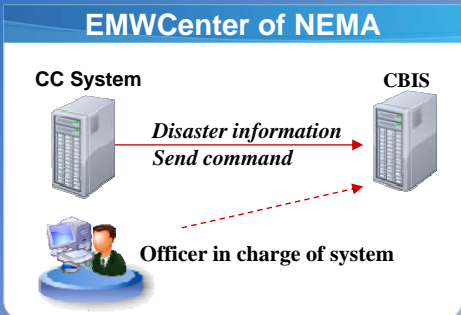


Nationwide /TV/

Nationwide /FM radio/

**Simultaneous automatic activation !!**

## Early Warning to Mobile Phones



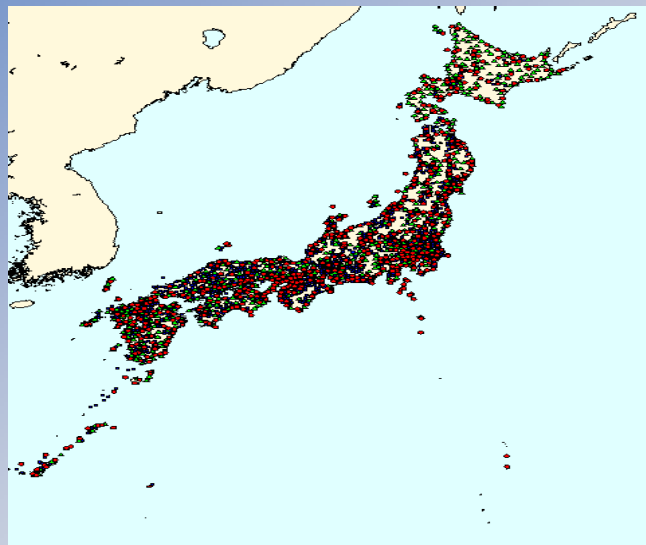
CBS (Cell Broadcasting Service) phone disaster notification broadcasting system

- ◆ The mobile communication technology that broadcast disaster message to mobile-phone users at base station transceiver subsystem, who have special receivable ID.
- ◆ Disaster message transmission to nation-wide or specific area resident users simultaneous at once.

### 3. Disaster early warning system in Japan

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#### Monitoring earthquake activities Seismic data Gathering System



4200 sites around Japan.

The earthquake monitoring system collates seismic data coming from seismographs installed in 4200 locations throughout Japan.

18

# Gathering and analyzing information on earthquake and tsunami

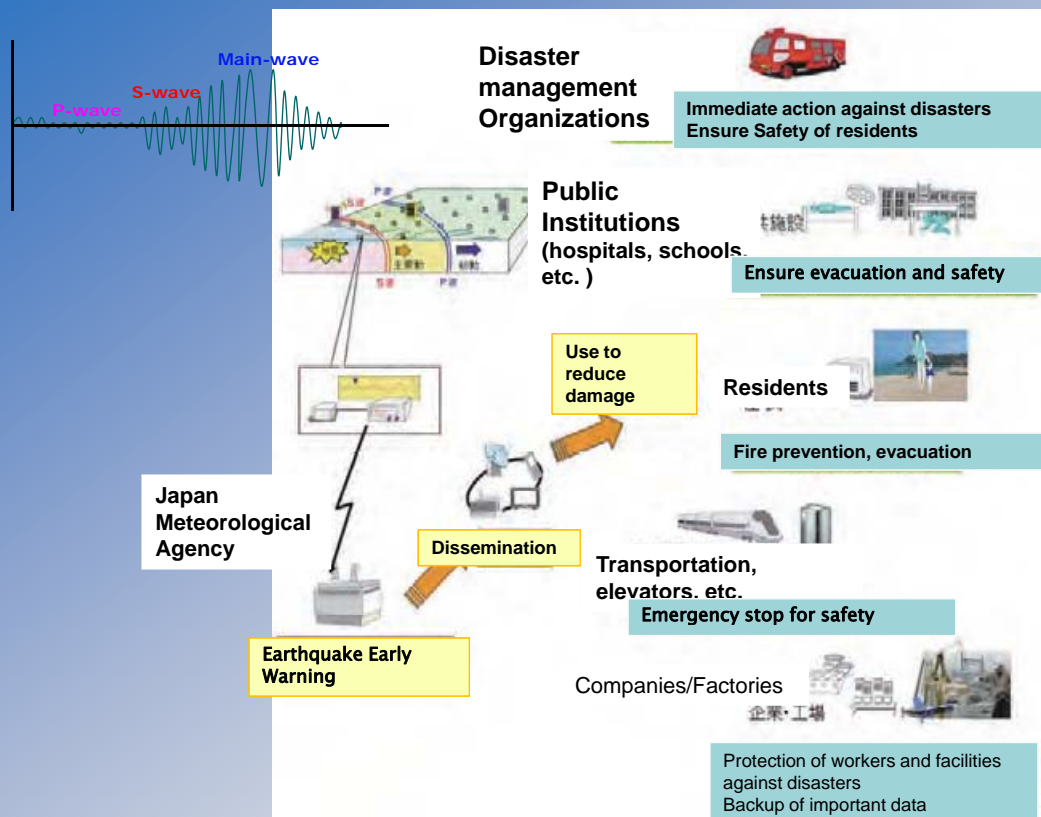
## EPOS (Earthquake Phenomena Observation System)



- Analyzes the seismic data for Earthquake and Tsunami.
- Announces Earthquake Warning alarm starting right after from detection of the earthquake.

19

# Earthquake Early Warning System



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# Delivering Information on Earthquake and Tsunami

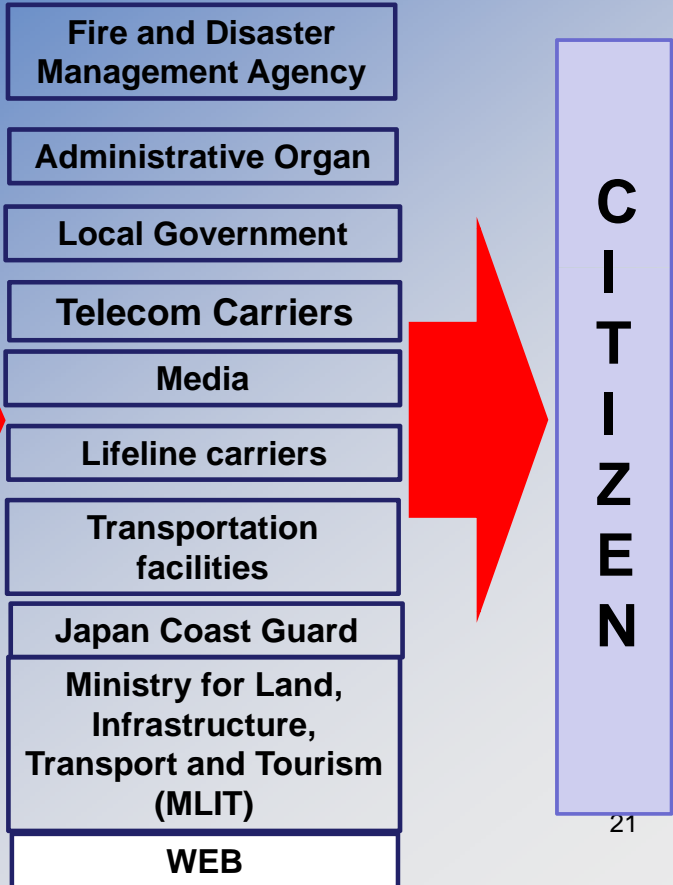
## Japan Meteorological Agency



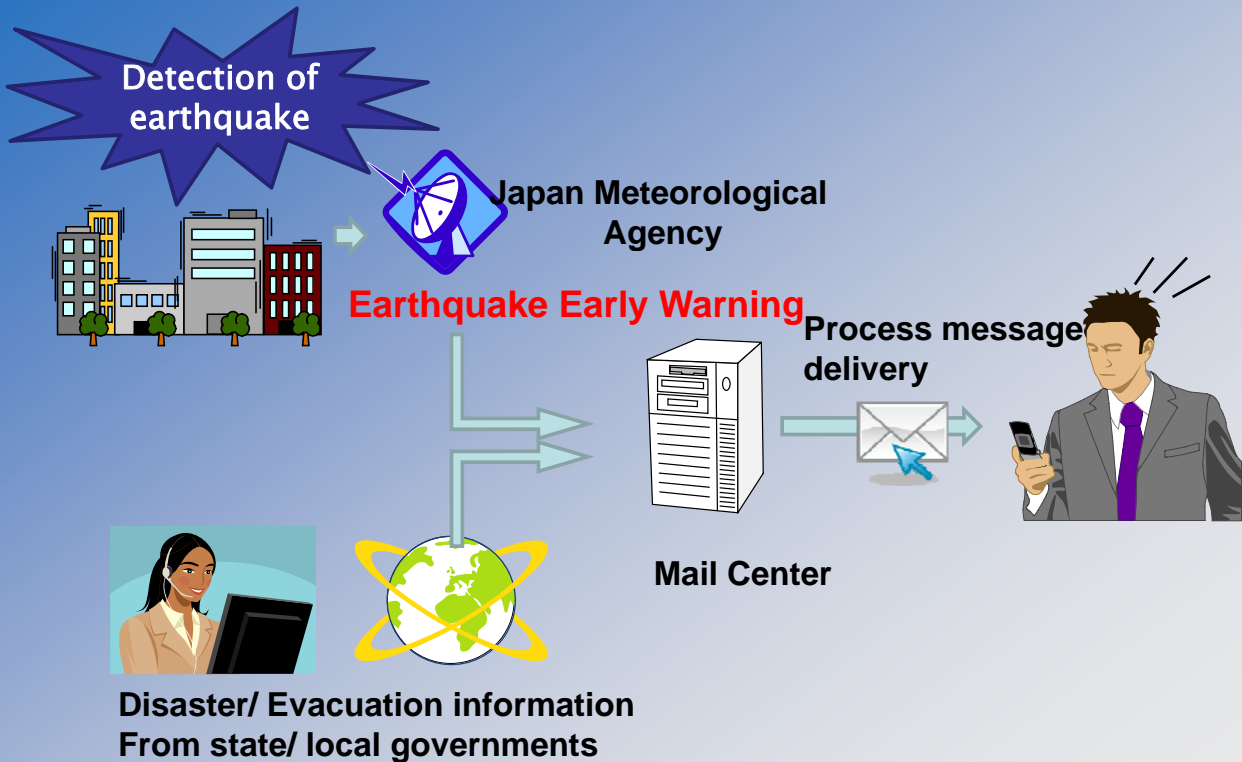
**EPOS**  
(Earthquake Phenomena Observation System)

Earthquake or tsunami warnings are instantly delivered to central & local governments, broadcasters, telecom carriers.

After receiving this warning, local government deliver alarm through their sirens or microphones.



# Early Warning to Mobile Phones



# Early Warning through Broadcasting System

Japan Meteorological Agency (JMA)

Broadcasting Station

EEW

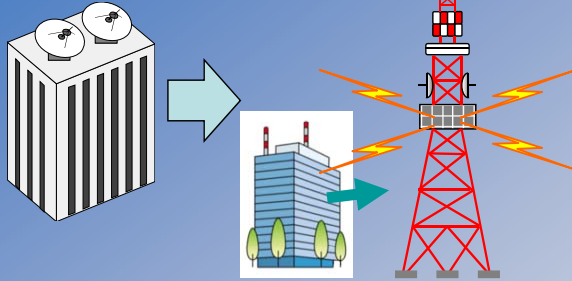
EWBS



Alert information in Program only



Alert information with "Switch-on" signal of receivers

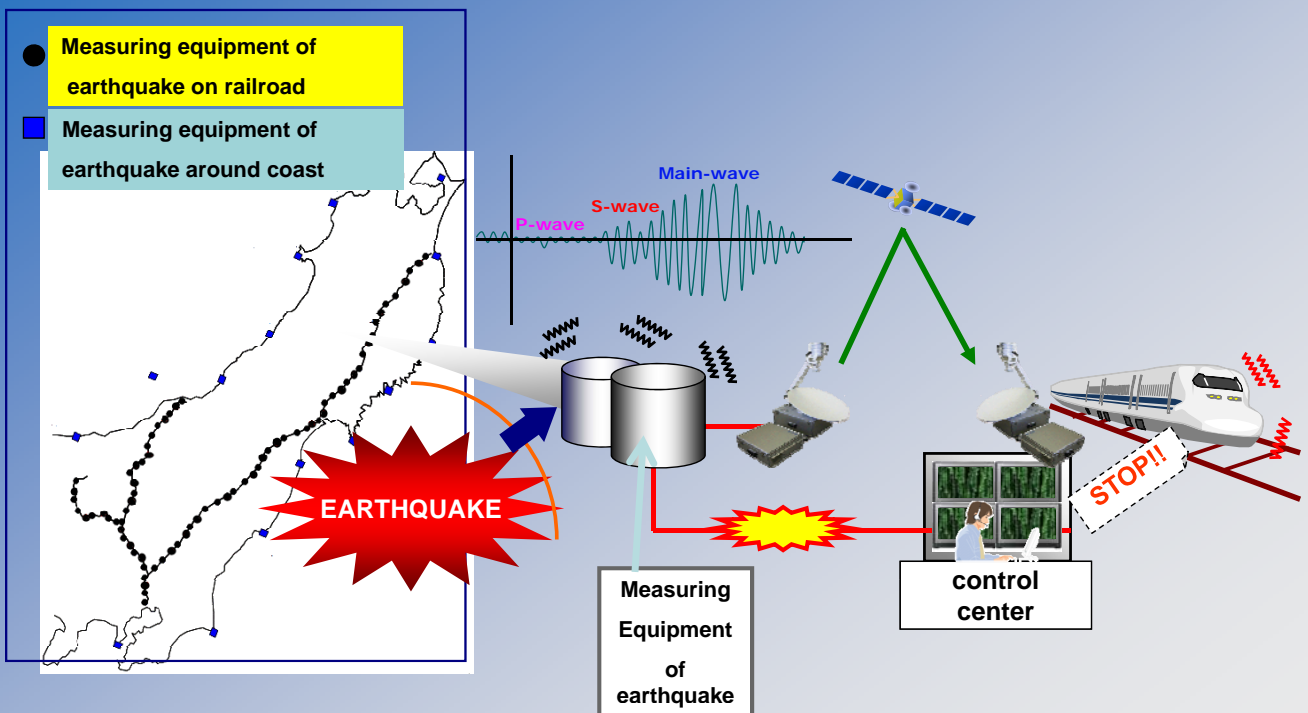


EEW: Earthquake Early Warning

EWBS: Emergency Warning Broadcasting System

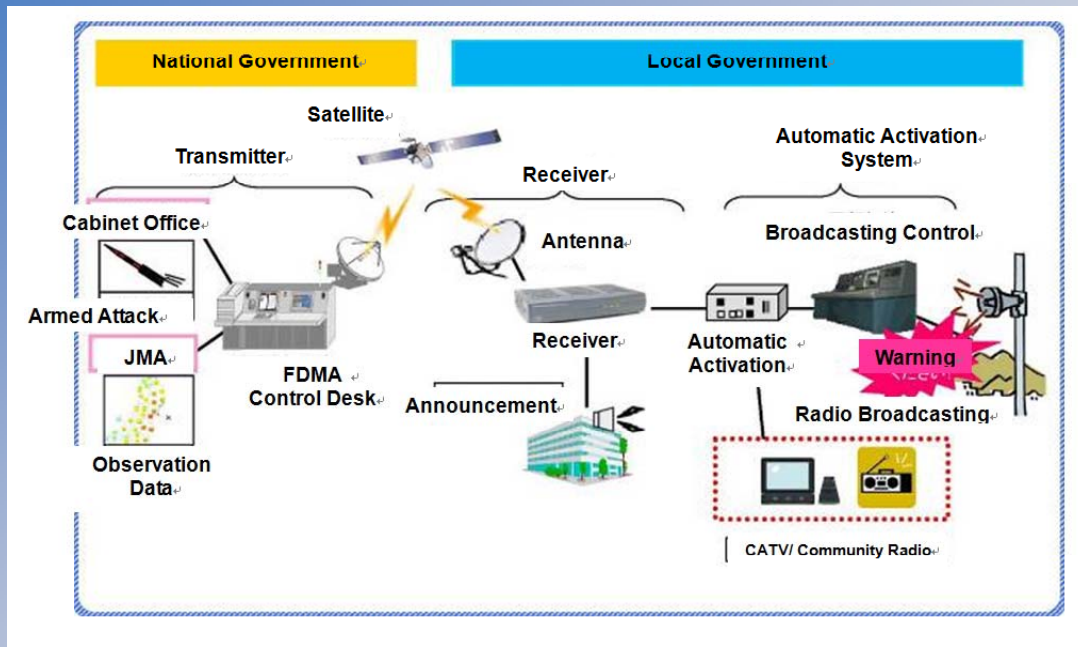
**Automatic activation !!**

# Emergency system for high-speed train

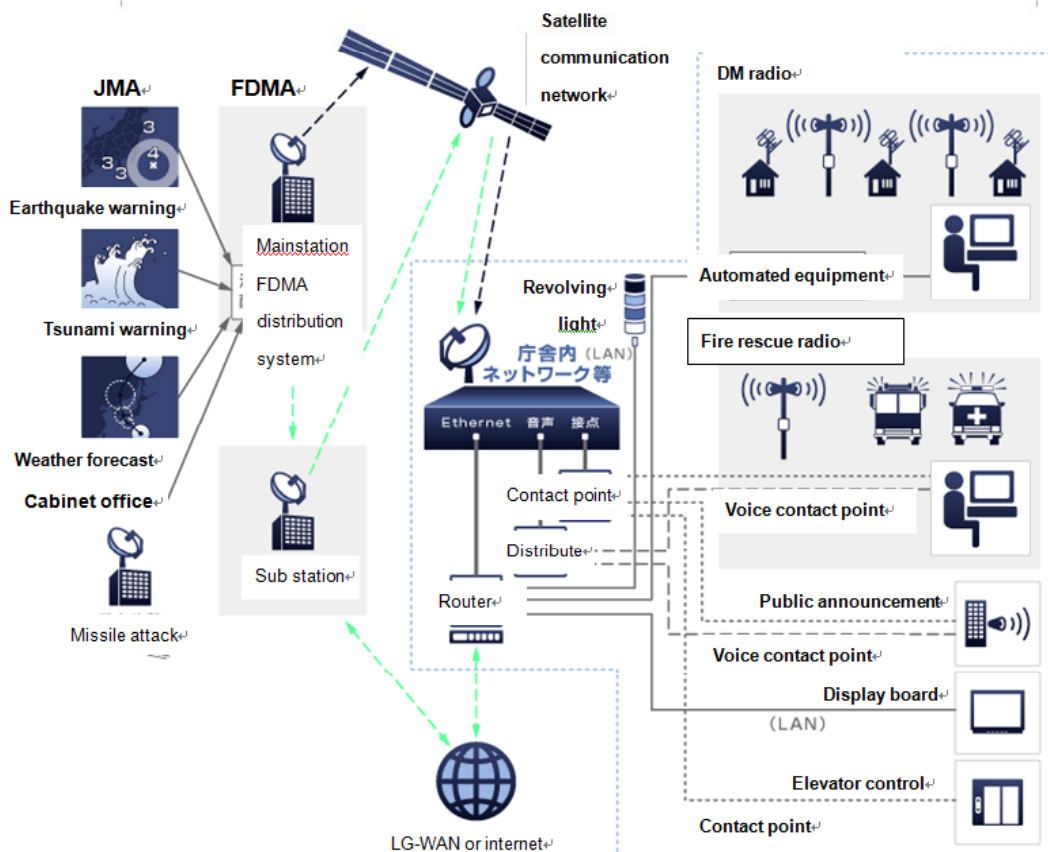


# J-ALERT system

J-ALERT is a nationwide warning system in Japan launched in February 2007. It is designed to quickly inform the public of various threats. J-ALERT is the system to immediately transmit emergency information such as Emergency Earthquake information, tsunami warning, information of ballistic missiles, which people have no enough time to deal with, is transmitted to the municipalities by using satellite (via the Fire and Disaster Management Agency, the Cabinet Secretariat, and JMA)



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# 4. Disaster information and communication in Japan, Tohoku earthquake March 2011

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Tohoku earthquake at 14:46:23 JST (Japan standard time) on March 11th, 2011, a 9.0 magnitude earthquake with a maximum seismic intensity of 7 occurred on the north eastern Pacific coast of Honshu, Japan. The seismograph station at Ouri in Ishinomaki City was the first of over 380 seismic stations across Japan to record seismic movement at 14:46:40.2 JST. As shown in table, the first earthquake forecast was issued to advanced users 5.4 seconds after the initial detection of p-waves.

Update number	Notes	Time in JST (hh:mm:ss.s)	Time since first P-wave detection (sec)	Estimated magnitude	Estimated maximum seismic intensity (shindo)	Latitude	Longitude
-	Initial Seismic Detection Time of p-wave	14:46:40.2	-	-	-	-	-
1	<b>First forecast issued to advanced users</b>	14:46:45.6	5.4	4.3	1	38.2	142.7
2		14:46:46.7	6.5	5.9	3	38.2	142.7
3		14:46:47.7	7.5	6.8	4	38.2	142.7
4	<b>First warning issued to the general public</b>	14:46:48.8	8.6	7.2	5-lower	38.2	142.7
5		14:46:49.8	9.6	6.3	4	38.2	142.7
6		14:46:50.9	10.7	6.6	4	38.2	142.7
7		14:46:51.2	11.0	6.6	4	38.2	142.7
8		14:46:56.1	15.9	7.2	4	38.1	142.9
9		14:47:02.4	22.2	7.6	5-lower	38.1	142.9
10		14:47:10.2	30.0	7.7	5-lower	38.1	142.9
11		14:47:25.2	45.0	7.7	5-lower	38.1	142.9
12	First warning issued for Tokyo area	14:47:45.3	65.1	7.9	5-upper	38.1	142.9
13		14:48:05.2	85.0	8.0	5-upper	38.1	142.9
14		14:48:25.2	105.0	8.1	6-lower	38.1	142.9
15	Final warning update	14:48:37.0	116.8	8.1	6-lower	38.1	142.9

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# Earthquake early warning

Provision to the public through:

- TV & Radio
- Cell phone services (NTT DoCoMo, KDDI, SoftBank Mobile)
- Municipal Disaster Management Radio Communication Network (via J-Alert (MIC FDMA))
- Other facilities

-TV (sample display)



(source: NHK)

-Speakers for residents  
(Municipal Disaster Management Radio Communication Network)



-Cell phone (sample display)



1 待受画面に緊急地震速報表示 →【0】(センターキー)

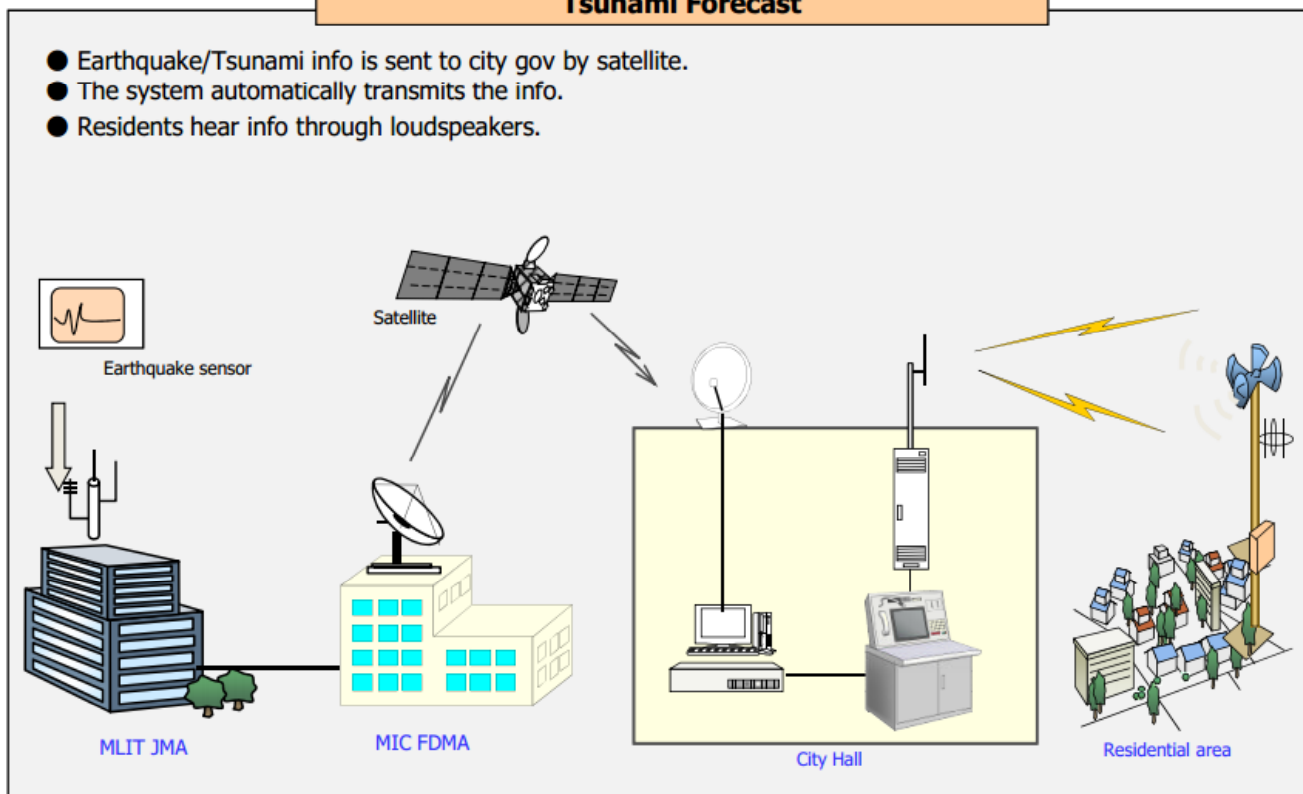
2 【0】(センターキー)

(source: KDDI)

## Municipal disaster management radio communication network

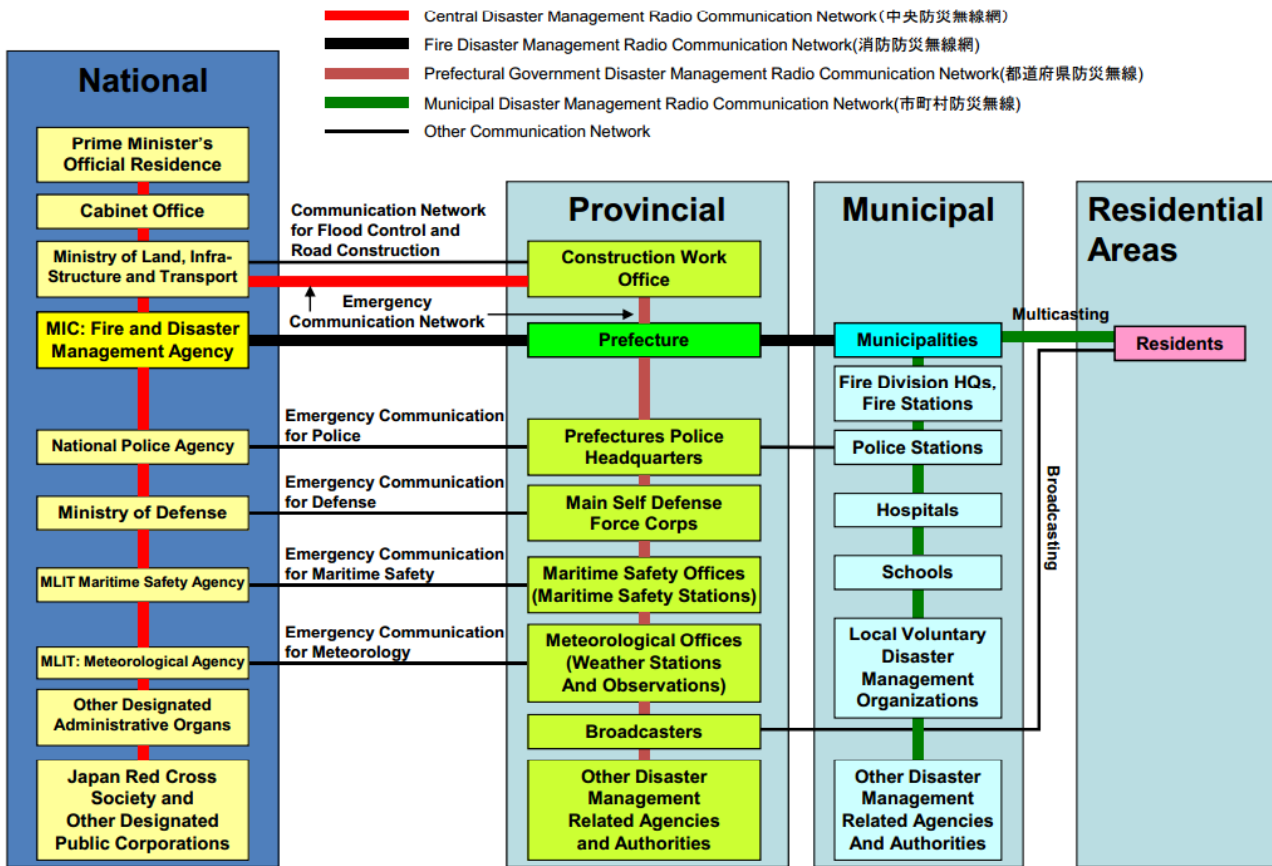
### Earthquake Early Warning Earthquake Forecast Tsunami Forecast

- Earthquake/Tsunami info is sent to city gov by satellite.
- The system automatically transmits the info.
- Residents hear info through loudspeakers.



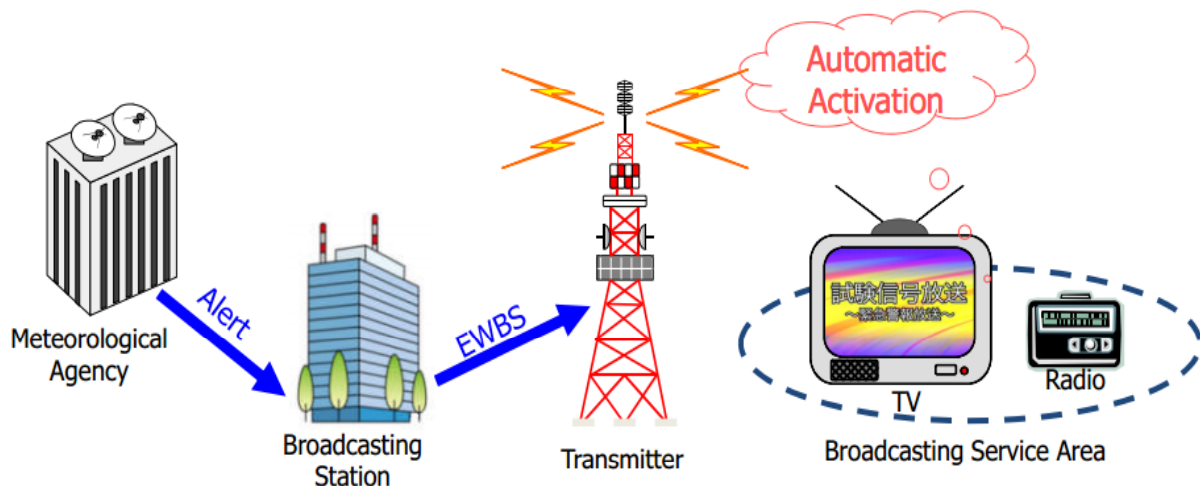


# Networks for information sharing

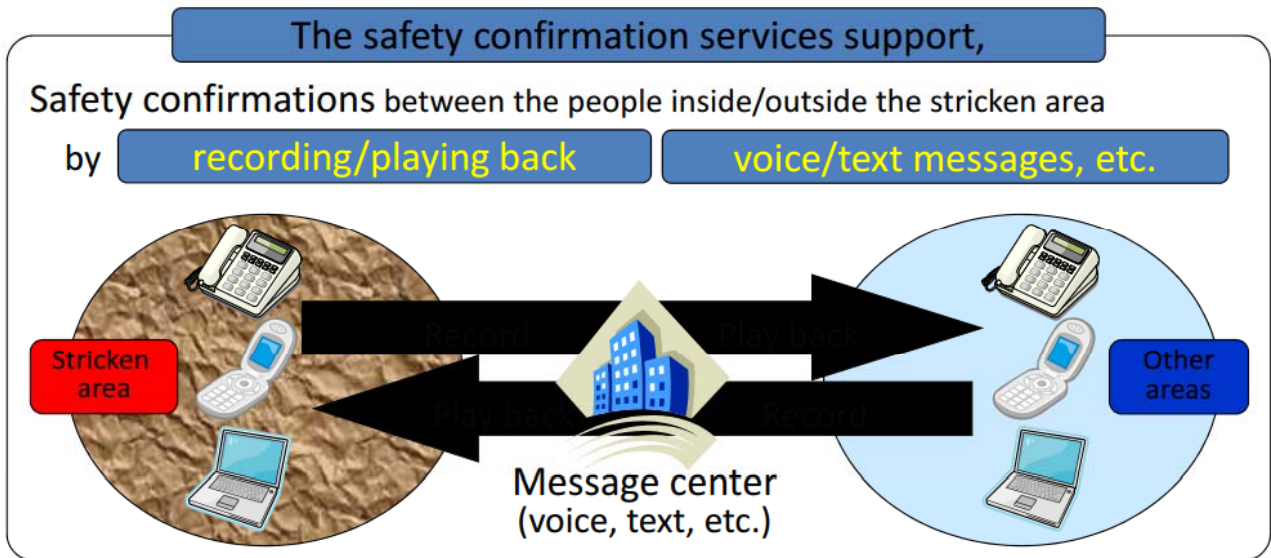


# Emergency warning broadcasting system

- EWBS (Emergency Warning Broadcasting System) is remote activation system for Radio & TV, which transmits alert/warning information to viewers and listeners about disasters even if those devices are switched off.
- EWBS is operated in response to large-scale earthquake warnings, Tsunami Alerts and broadcast requests from local governors.
- EWBS has been operated since September 1985.



# Safety confirmation services



(source: NTT East)

# Safety confirmation services

## Disaster Emergency Message Dial



- Provided by NTT Communications (System operation: NTT EAST/WEST)

(source: NTT East & West)

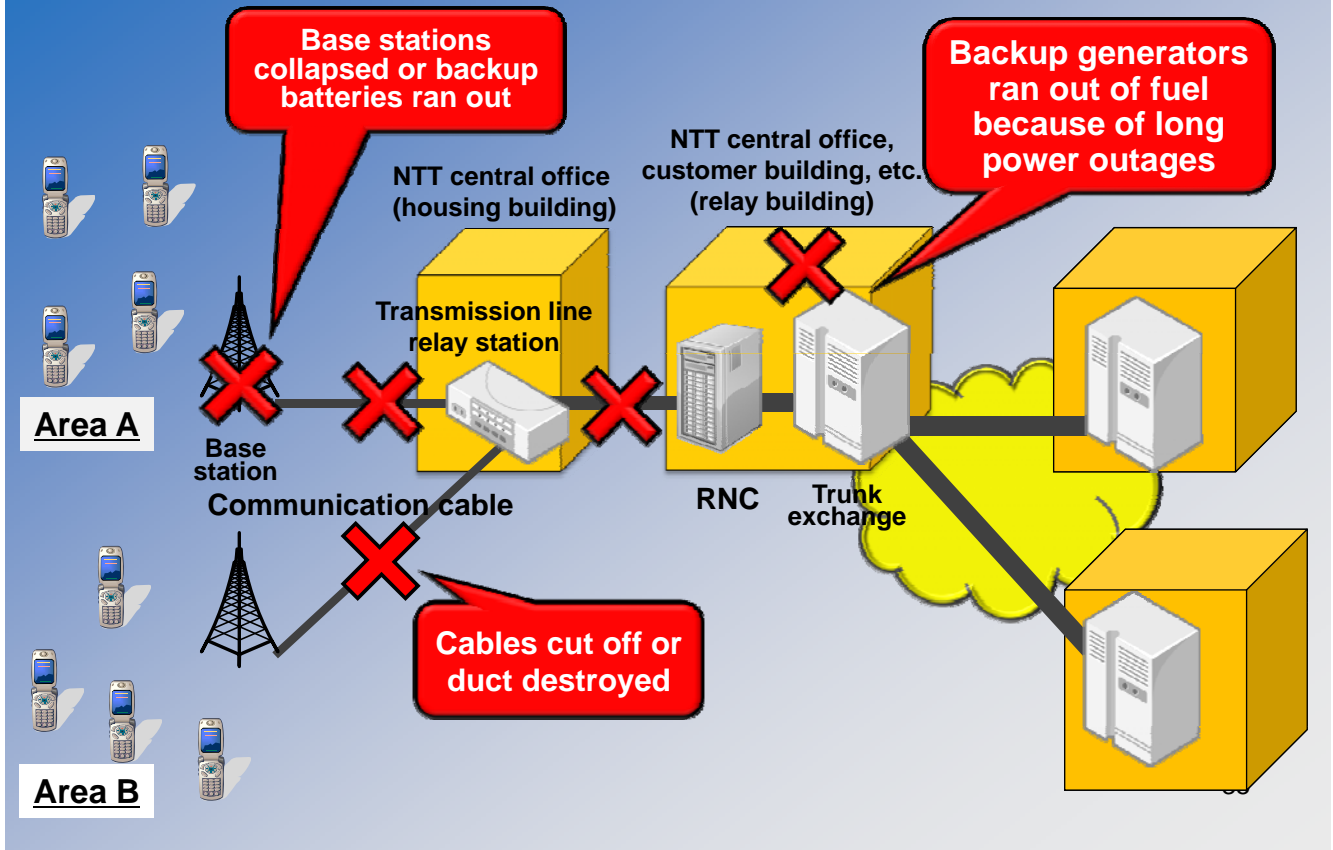
### Basic Operation Method for Disaster Emergency Message Dial (171)

Dial 171 and follow the voice prompts to record or play back a message.  
\*Actual voice prompt is played back in Japanese.

Operation procedure	Record		Playback	
① Dial 171	<b>171</b>			
	[Prompt] This is the Disaster Emergency Message Dial Center. To record, please dial 1, to play back, please dial 2, to record using a PIN number, please dial 3, and to play back using a PIN number, please dial 4.			
	(No PIN number)	(With PIN number)	(No PIN number)	(With PIN number)
② Select record or playback.	<b>1</b>	<b>3</b> [Prompt]Please dial a 4-digit PIN number. XXXX	<b>2</b>	<b>4</b> [Prompt]Please dial a 4-digit PIN number. XXXX
③ Enter the telephone number of the person in the disaster-stricken area.	[Prompt] If you are inside the disaster-stricken area, please dial the telephone number of your house or the telephone number of a person inside the disaster-stricken area that you want to contact, starting with the area code. If you are outside the disaster-stricken area, please dial the telephone number of a person inside the disaster-stricken area that you want to contact, starting with the area code. <b>0 XXX XXX XXX XXX</b>			
<b>Connected to the Message Dial Center.</b>				
[Prompt] A message will be recorded for telephone number 0000XXXX (PIN number XXXX), if you are using a touch-tone telephone, please press number 1 and then press sound ②. If you are using a dial telephone, please wait. If you entered the incorrect telephone number, please hang up and call again.				
	Dial telephones	Touch-tone telephones	Dial telephones	Touch-tone telephones
	[Please wait until the prompt is played.]	<b>1 #</b>	[Please wait until the prompt is played.]	<b>1 #</b>
	[Prompt] Please record your message. Please leave a message within 30 seconds after the beep. After you finish talking, please hang up the telephone.	[Prompt] Please record your message. Please leave a message within 30 seconds after the beep. After you finish talking, please press number 3 and then press sound ②.	[Prompt] The messages will be played back starting with the newest.	[Prompt] The messages will be played back starting from the new message. To repeat a message, please press number 3 and then press sound ②. To play the next message, please press number 5 and then press sound ②.
④ Record the message. Play back the message.	<b>Message recording</b>		<b>Message playback</b>	
	[Please wait until the prompt is played.]	After finishing recording <b>9 #</b> [Prompt] The message will now be repeated. To re-record the message, please press number 9 and then press sound ②. The contents of the recorded message can be checked. [Prompt] Your message has been saved.	[Prompt] All the messages have been played back.	[Prompt] All the messages have been played back. To record an additional message, please press number 3 and then press sound ②. [Please wait until the prompt is played.]
⑤ Finish	The call is ended automatically.			

Please remember the emergency voice message board: Disaster Emergency Message Dial (171)

# Locations of Damage to Mobile Networks



## Satellite-based Mobile Phones

**Delivered satellite terminals urgently by cars, helicopters and manpower. Took a few days.**



NTT docomo



Handheld Terminal



Portable Terminal

Iridium



Inmarsat

# Supplying temporary capacities

(as of April 7)

## □ Telecommunications carriers

- **Over 100 portable power generators and 37 mobile base station trucks have been provided.**
- **Public telephone calls are not charged; approximately 2,300 new public telephones have been specially installed.**
- **Free internet connections have been set up at evacuation centers.**
- **Basic telephone rates have been reduced or waived altogether, and payment deadlines have been extended.**

## □ Broadcasters and manufacturers

- **In cooperation with various manufacturers, NHK has been installing 750 televisions and 760 radios in evacuation centers. Manufacturers such as Panasonic and Sony have been supplied over 40,000 radios.**

(source: MIC)

## 5. Planning of Disaster Early Warning System

Early warning (EW) is “the provision of timely and effective information, through identified institutions, that allows individuals exposed to hazard to take action to avoid or reduce their risk and prepare for effective response.”

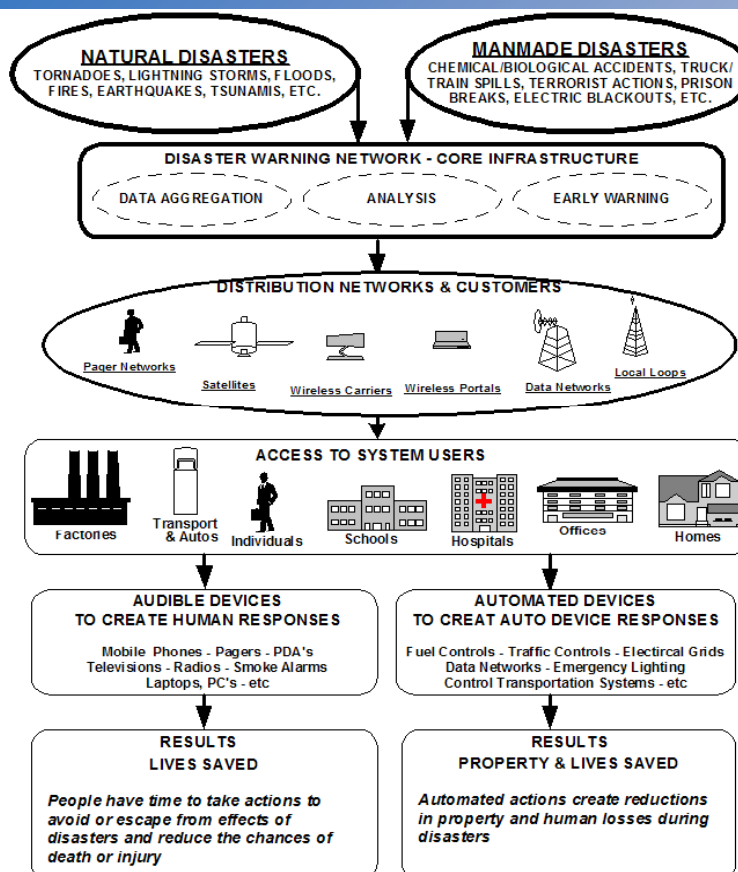
1. *Risk Knowledge*: Risk assessment provides essential information to set priorities for mitigation and prevention strategies and designing early warning systems.

2. *Monitoring and Predicting*: Systems with monitoring and predicting capabilities provide timely estimates of the potential risk faced by communities, economies and the environment.

3. *Disseminating Information*: Communication systems are needed for delivering warning messages to the potentially affected locations to alert local and regional governmental agencies. The messages need to be reliable, synthetic and simple to be understood by authorities and public.

4. *Response*: Coordination, good governance and appropriate action plans are a key point in effective early warning. Likewise, public awareness and education are critical aspects of disaster mitigation.

# Disaster early warning system





**Thank you for your  
attention!**  
**Arigato gozaimasu!!!**

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