# DEVELOPMENT OF DISASTER WARNING SYSTEM USING DMB (DIGITAL MULTIMEDIA BROADCASTING)

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## Abstract

More than 200,000 people were killed by an earthquake beneath the ocean. It was sent giant waves crashing ashore places as far apart as Indonesia, Thailand, Sri Lanka, and Bangladesh.

It was affected by tsunami in the Southeast Asia in 2004. The tsunami damaged properties and human casualties in Southeast Asia. The necessity of disaster information sharing and disaster warning system implementation have been issued and discussed in U.N and APEC.

This research is to investigate advantages of a DMB (Digital Multimedia Broadcasting) technologies to develop a warning and broadcasting systems for typhoon, earthquake and tsunami disaster information in disaster impacted areas. It is also develop a model the information sharing scheme for disaster information to damaged area.

## Research Background and Objective

The disaster damages resulted not only in life and property damages of the individual, but also, could be spreaded situation of national crisis. The systematic control on disasters management such as, Mitigation and Preparedness, Response, Recovery activity is necessary. And state of the art equipment, the structure of quick response, the structure of cooperation between an organization related disaster management and volunteer are required for efficient disaster management.

More than 200,000 people were killed by an earthquake beneath the ocean. It sent giant waves crashing ashore places as far apart as Indonesia, Thailand, Sri Lanka, and Bangladesh. Many cuntries in the Southeast Asia were affected by tsunami in 2004. The tsunami damaged properties and human casualties in Southeast Asia. The necessity of disaster information sharing and warning system implementation has been issued and discussed in U.N and APE.
The growing necessity of disaster warning system issused by tsunami's the damage recently. Because of tsunami, the Indian Ocean countries that suffer great damage are quick and correct warning system induction of country dimension.

This research is to investigate advantages of a DMB (Digital Multimedia Broadcasting) technologies to warn broadcasting systems for typhoon, earthquake and tsunami disaster information in disaster area. It is also develop a model for the information sharing scheme in damaged area.

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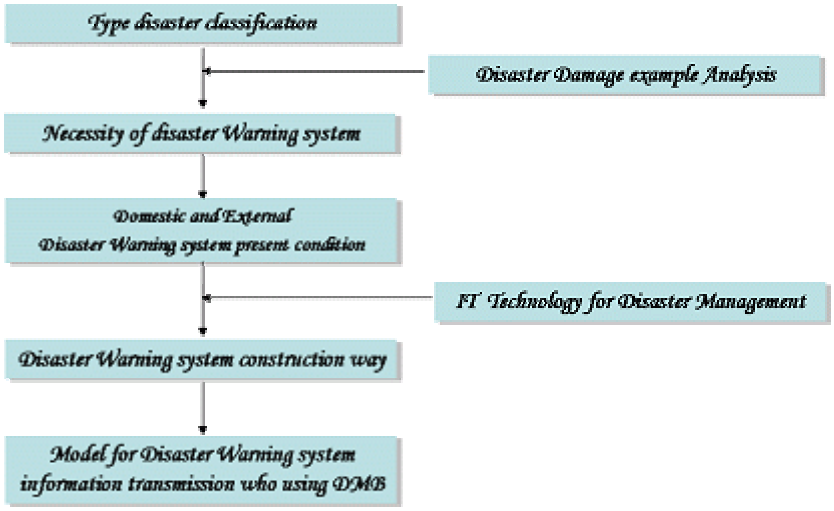
Research Procedure & Scope

This research defines disaster damage types and presents necessity of disaster warning system through damage type example. The disaster warning system development take advantage of IT technology achieve according to study procedure with [Figure 1].

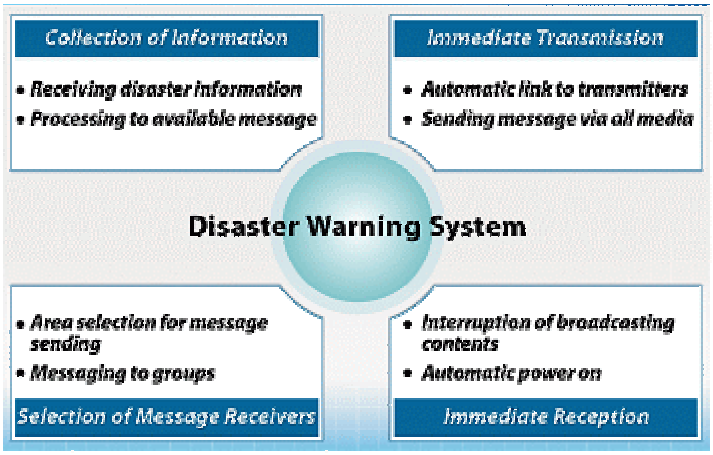



[Figure 1] Research Procedure

It is necessary to define disaster and present necessity of disaster warning system through disaster type statistical analysis. It is to present domestic and external disaster warning system operation state are currently used and developed. At last, the disaster warning system development method are presented to take advantage of IT technologies. The model for information transmission in disaster warning system that apply DMB of IT technology.

## Disaster Warning System

Disaster warning system is to warn and inform to population (people) and an organization related disaster management in case disaster occurrence danger is predicted. [Figure 2]1) It presents a function and role for disaster warning system. Disaster warning system manages information for disaster hot spot to database with earthquake hot spot, fire hot spot, damage by a flood hot spot, crash danger facilities. It is included in collecting data using artificial satellite & high technology that is installed in area and inform disaster information using means of communication & broadcasting in case disaster occurrence danger is predicted.

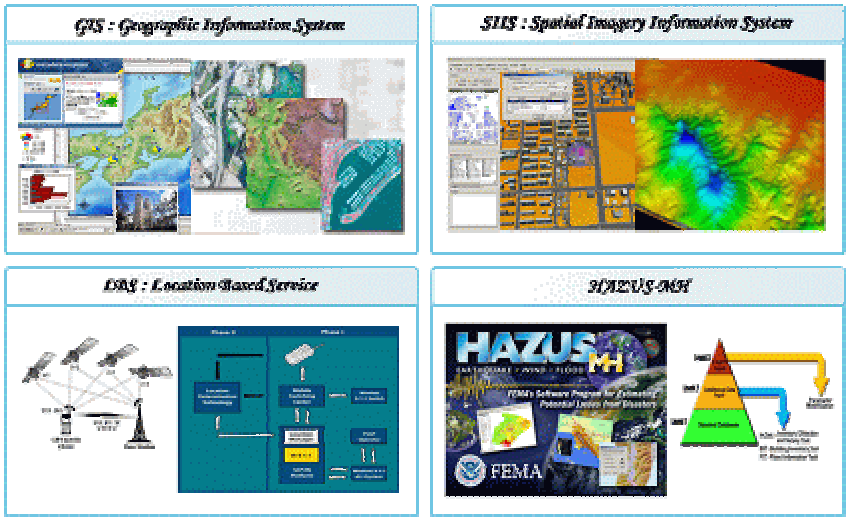



[Figure 2] Disaster warning system function and role

It is difficult to predict in when and what area disaster may happen technologically. However, if a correct disaster information of disaster warning system is transmitted to an organization related disaster management and population (people), life and property damage can be minimized.

## IT technology for disaster management such as Mitigation and Preparedness, Response, Recovery activity

The mitigation and preparedness activity steps are analyze disaster types scientifically using GIS(Geographic Information System) and do near training with actuality disaster situation to development of simulation. On Figure 3, it is presented the disaster managemen which take advantages of IT technology at Mitigation and Preparedness activity step



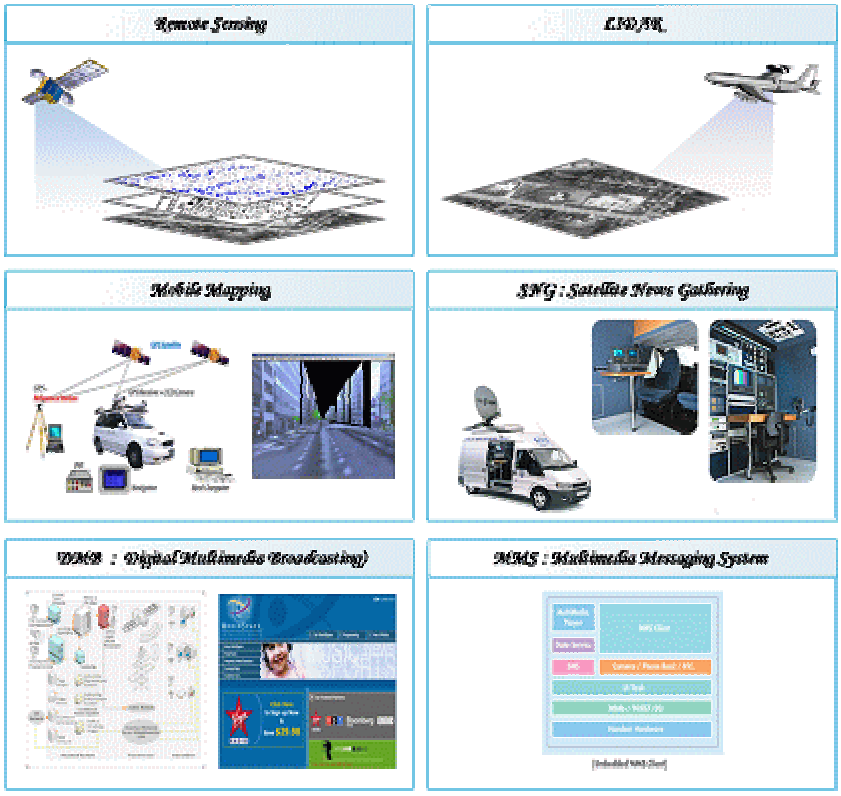

[Figure 3] Disaster Management Mitigation and Preparedness activity connection newest IT technology

On disaster response and recovery activity steps, it utilizes wireless communication network to transfer information quickly, and investigate correct and quick disaster damage situation taking advantage of IT technology. On Figure 4, It is presented disaster management which take advantages of IT technology at response and recovery activity step

## Development of disaster warning system

Science of meteorology, physics, earth science etc and ICT(Information and communication Technology) technology are used as complex disaster warning system development. Disaster management warning system is consisted of disaster situation observation, analysis and prediction & judgment, disaster information transmission

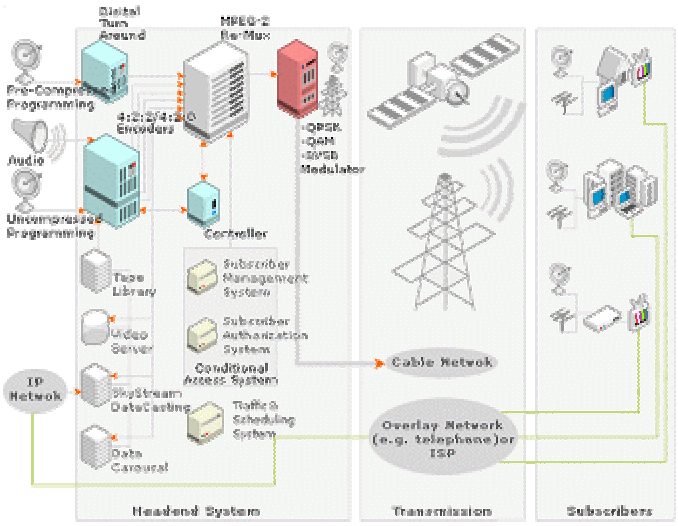
The disaster situation observation is a activity that take advantage of suitable observation mourning in type of disaster and create basis data to prediction & judgment disaster situation. For example, typhoon uses satellite & AWS(Automatic Warning System) and earthquake observes situation about disaster through seismograph.
Second, the disaster situation analysis and prediction & judgment are the activities that collect source data(seismic data, water level data, tsunami data) that is observed and create information that need in decision-making. Processed data are used to make a foundation in disaster management mitigation and preparedness, response, recovery activity. Third, the disaster information transmission is a activity that inform to disaster information organization related disaster management and population(people) since decision making about a disaster warning was finished.



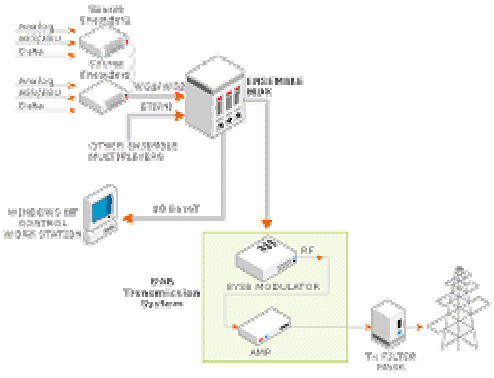

[Figure 4] Disaster management Response and Recovery activity connection newest IT technology

## Disaster warning system that applied DMB(Digital Multimedia Broadcasting)

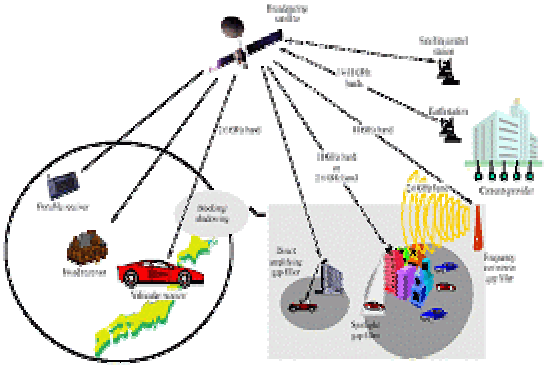
The DMB is to provide high-quality animation, an audio and multimedia broadcast such as data during movements by an abbreviation of digital multimedia broadcast. In the case of ground wave DMB, it is technology observed worldwide because being developed first time in korea. DMB broadcasting is changed to provide high-quality image service while moving the broadcast that watch into living room or domestic fixed form with [Figure 5]




[Figure 5] DMB key map

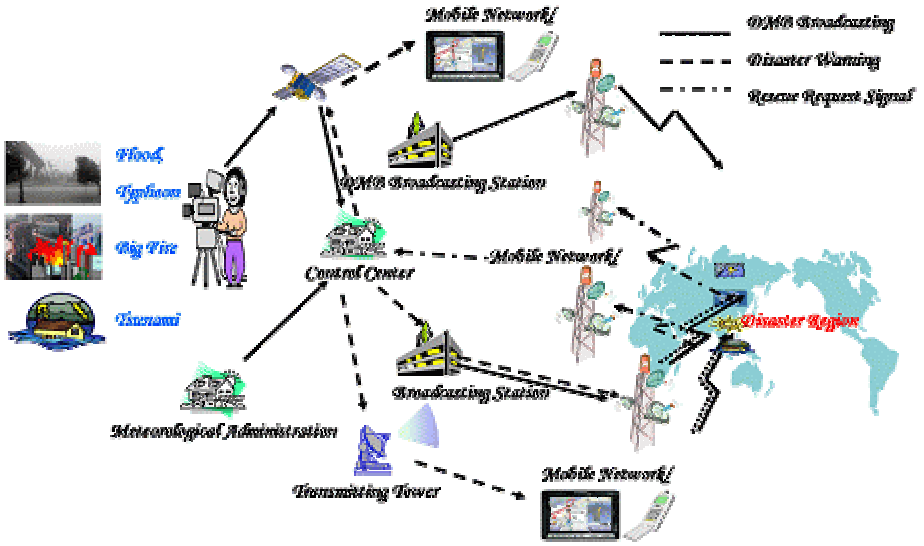


[Figure 6] Ground DMB key map



[Figure 7] Satellite DMB key map

The enough reason of using DMB are evaluated by service of most suitable for disaster broadcasting since it is individual service technology that use carrying along terminal. The DMB has capability of quickness and mobility that can transmit disaster warning and evacuation hand-bell to various data to people when produce disaster. Disaster warning system that use DMB with [Figure 8]. It informs disaster information to disaster area's people through ground wave broadcasting and satellite in case various disasters happened. Peoples' judgment for disaster situation would be through passed disaster information, and transmitted to organization related disaster management guides the nearest shelter through DMB broadcasting to disaster local resident. The DMB terminal owner receives shelter information through voice guidance, image, photography, data and may be respond from disaster.




[Figure 8] Disaster warning that take advantage of DMB

The disaster warning system take advantage of DMB, as moving voice of high quality & image service(TV) can receive in-comming, and can transmit information of high-capacity.
However, it would be including engineering problem, economical problem, Terminal diffusion problem etc to the disaster information transmission which take advantage of DMB.

## Conclusion

Damage by the earthquake strike Southeast Asia vicinity December, 2004 did to recognize the importance of disaster warning. Early warning center managers who are situated in Djakarta

can predict beforehand about earthquake sea wave. However, it presented problems about transmission methods that can inform these disaster information to fishermen or Sri Lanka's candy store master and native people. Disaster information transmission is necessary to minimize life and property damage informing disaster situation to people through all communication mediums that take advantage of IT technologies.

Disaster information transmission that take advantage of ICT is the one of way that can inform disaster information rapidly and correctly to local residents in the country. One of the disaster information transmission technology that take advantage of ICT does to recognize disaster warning being processed by caption on DMB broadcasting reception terminal lower column as soon as urgency warning of typhoon, heavy rain, heavy snow is possibly transmitted. The DMB can be used to help on watching disaster warning broadcasting always. The DMB broadcasting can offer disaster information in isolated situation by disaster because video signal through ground wave and satellite is passed.

Additional, CBS (Cell Broadcasting Service) disaster information transmission can inform disaster information to a moving person when disaster happened. And in dead of night period of time, can communicate disaster information to people through medium of transfer communication in case disaster happens. The disaster information transmission takes advantage of ICT technology can reduce damages since transmit and deliver disaster information rapidly and correctly.

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