WORKSHOP ON DISASTER MANAGEMENT

Emergency Alert and Disaster Mitigation

A Lesson Learned From Indonesian Disaster Experience
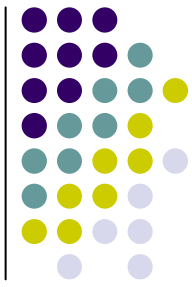
BY

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IMPACT OF ACEH TSUNAMI AND NIAS EARTHQUAKE

The Total Losses USD 4.5 Billion among this figure, total losses of telecommunication infrastructures is **USD 22 Millions** (USD 19 Millions for damages and USD 3 Millions for losses)

- **Number of victims in Aceh tsunami:**
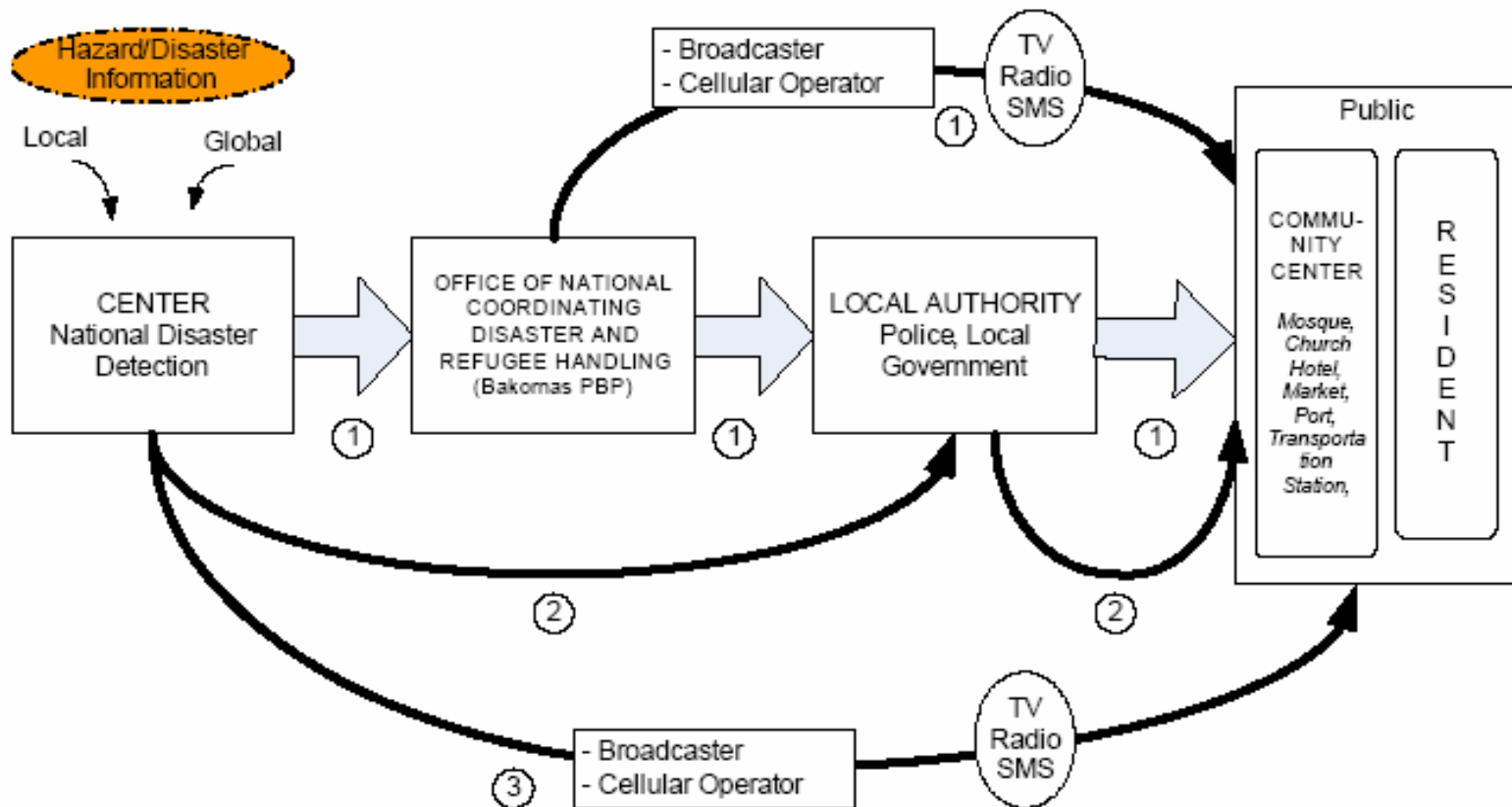- Dead   100,258
- Missing   132,000
- Wounded   1,016
- Refugees   417,124
- Damages include: 1.3 million homes and buildings; 8 ports and 4 fuel deports; 85% of water, 92% of sanitation system; 120 km of roads and 18 bridges.
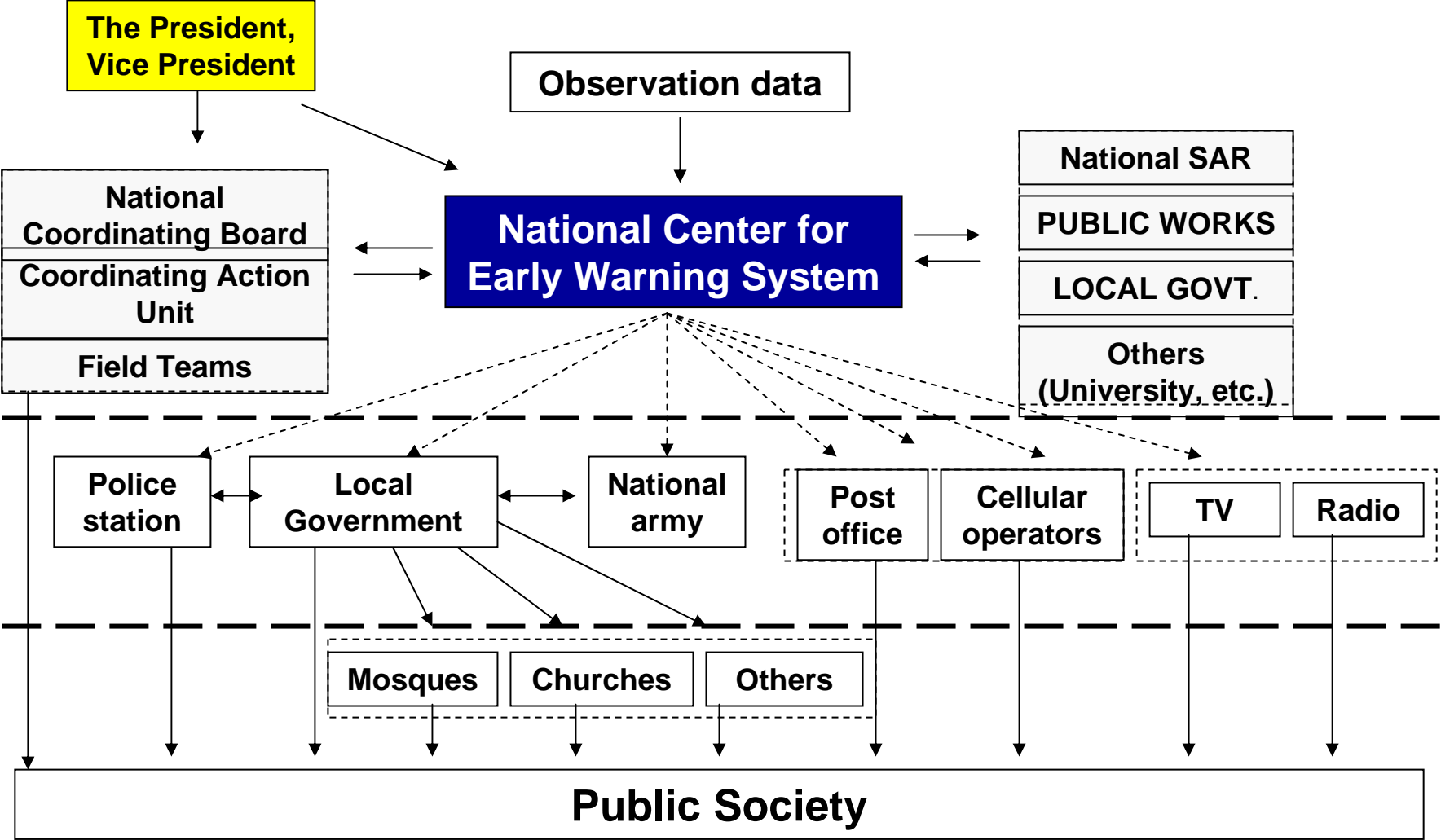
Early Warning System

- Early warning system shall be prepared to anticipate *all hazards* in order to reduce and mitigate the *disaster*
- Disaster is a hazard which causing as follows:
  - Human loss
  - Material loss/damage
  - Immaterial loss
- With early warning system, hazards: :
  - May be reduced
    - If there is enough time available from time of hazard detection to evacuate the people
    - Example: Tsunami, flood, fire, disease, landslide, etc
  - Can not reduced
    - No time from hazard detection to evacuate the people
    - Example: Direct earthquake tremor

NATIONAL EARLY WARNING SYSTEM
NEWS-Indonesia

Hazard/Disaster Information

Local · Global

CENTER
National Disaster Detection

① OFFICE OF NATIONAL COORDINATING DISASTER AND REFUGEE HANDLING (Bakornas PBP)

① LOCAL AUTHORITY Police, Local Government

① Public

- Broadcaster
- Cellular Operator

① TV Radio SMS

COMMU-NITY CENTER

Mosque, Church Hotel, Market, Port, Transportation Station,

R E S I D E N T

② ②

- Broadcaster
- Cellular Operator ③

TV Radio SMS

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Indonesia Early Warning Organization Structure

# Early Warning Information System

- **Preventive and anticipative activities**
  - Education regarding disaster anticipation in office, school, residential, etc, through TV and radio broadcasting and also printed leaflet
  - Weather forecast through TV broadcasting
  - Full-time monitoring of several major disasters (earthquake, tsunami, floods, extreme climate, etc)
- **Disaster relief activities**
  - Victim evacuation (live or dead)
  - Handling of refugee/victims
  - Damage rehabilitation

In Case Hazard Coming…

- How to disseminate right information regarding the forthcoming disaster to people in location where the disaster is predicted as soon as possible such a way that people can protect or evacuate themselves to more safe place

- Determination to evacuate the people because of predicted
  - disaster need certain legal and political decision, because of::
  - It will affect degree of people belief to the early warning system
  - Risk of legal challenge
  - Risk of false warning

- In some countries, early warning to evacuate people usually announced by Head of the Government or Appointed Officer

# Disaster Information Format to Public through Multi Mode Media
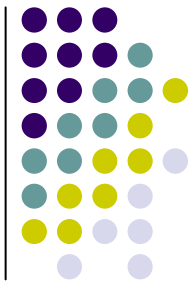
- **Broadcast Mode: Information target is public**
  - Terrestrial Sound Broadcasting (FM, AM): Audio news
  - Terrestrial TV Broadcasting: Telops (breaking news)
  - Cellular phone: sms broadcast / text
  - Internet: e-mail, portal
- **Multicast Mode: Information target is local authority**
  - Satellite TV and Sound Broadcasting: Telops (breaking news)
  - Satellite phone: voice, text, and picture
  - Cellular phone: voice, text
  - Telephone/Fax: voice, picture, text
  - Internet: e-mail, portal
  - Radio Amateur and Citizen Band: voice, text
- **Others: Information target is residential**
  - Police radio communication (Handy Talkie, cellular, etc): voice
  - Siren, Bell, Loudspeaker, Display, Traditional Instrument, etc: voice, text
  - Public place: mosque, church, temple, market, etc: voice

Using Loudspeaker as a disaster warning to public

☐ Using loudspeaker in mosque, bell, traditional instrument, display board, etc , is very effective to attract people attention.

☐ Communication distance is 200 to 300 m for voice warning, 1 to 2 km for siren.

Meteorology
Geophysics
Office

Public speaker

TSUNAMI

Display board

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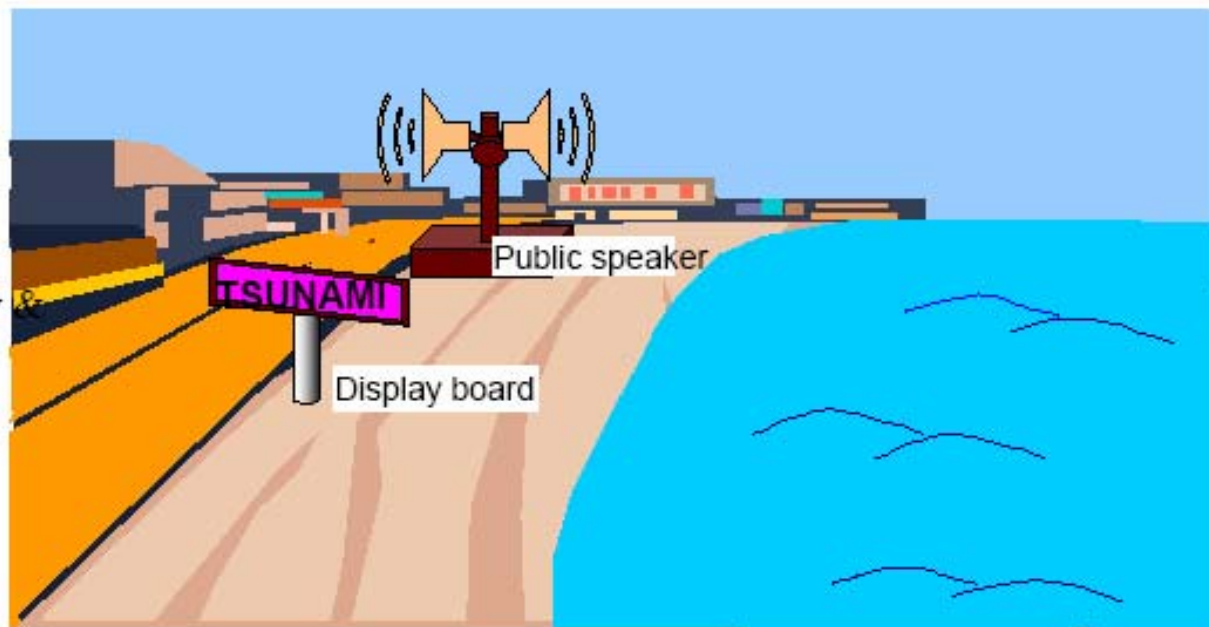
Space-based Information for Disaster Management Support
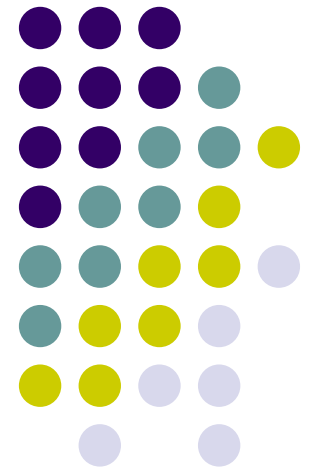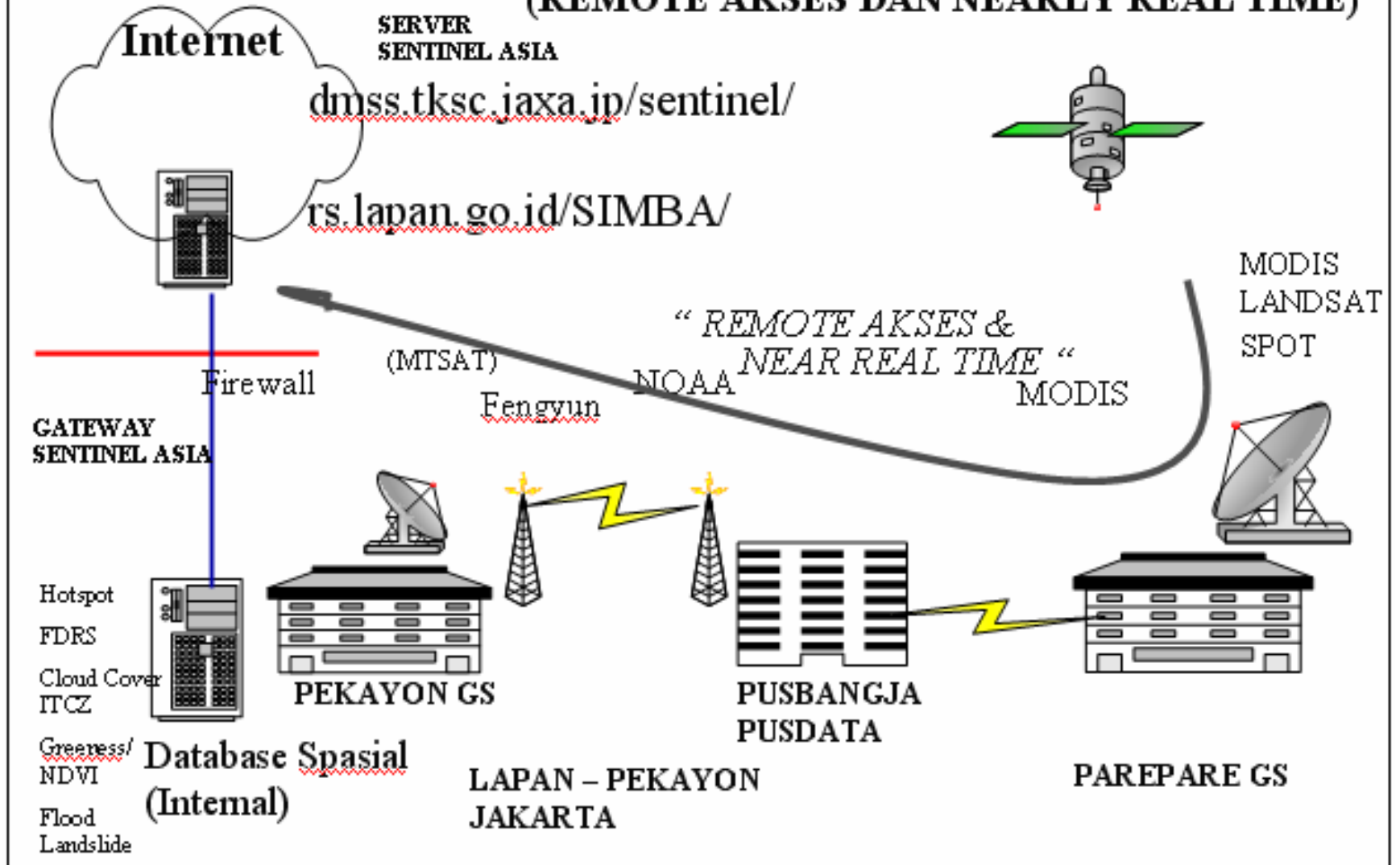
LAPAN's Role in Disaster Management

- Use Earth Observation And Meteorological Satellites Data For Disaster Management/Mitigation, by:
  - GOES-9 (Global Observatory Earth System), MTSAT (Multifunction Transport Satellite), NOAA/AVHRR, Terra/Aqua MODIS (Moderate Resolution Imaging Spectro-radiometer), Feng Yun-1D, Landsat-7, SPOT, IKONOS, ALOS
  - Remote Sensing Data: high and very high resolution earth observation data (such as: Landsat, SPOT, ALOS, IKONOS, Quick Bird)
- To Support Decision-aids Including Prevention, Planning, Relief, Rehabilitation, And Reconstruction Of Disaster Management
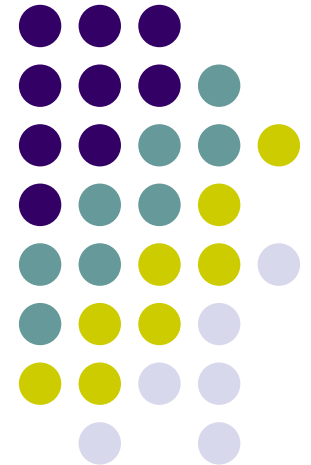
Significant Improvements In Capability

- Preparedness: Early Detection, Warning And Response To Natural Disasters, Especially For Monitoring Weather/Climate Anomalies, Droughts, Floods, Forest Fires
- Prevention - Impacts To Indonesia's Weather a.o.
  - Tropical Depression And Cyclone Tracks, Daily Cloud Cover And Rainfall Estimation; Daily And Monthly Extreme Weather; Weekly Greenness Vegetation (NDVI) Monitoring; Monthly Crop Conditions (Growth And Yield) Prediction; Daily Potential Flooded Area Monitoring; Monthly Climate Prediction
- Relief/ Emergency response, rehabilitation and reconstruction:
  - Rapid mapping & damage assessment: agricultural production loss, etc
  - Food insecurity assessment to ensure aid undisturbed supply: Aceh Tsunami, Yogyakarta Earthquake, Pangandaran tsunami
- Related International Pilot Projects
  - Sentinel Asia – Disaster Management Support System in AsPac Region (APRSAF- AsPac Space Agency Forum); Digital Asia Network; IEWS (Indonesia multi hazard Early Warning System); WINDS (APRSAF-Comm. Satellite Working Group); GEO (Group on Earth Observation)

INFORMATION ROADMAP AND DATA PROCESSING
(REMOTE AKSES DAN NEARLY REAL TIME)

Internet

SERVER
SENTINEL ASIA

dmss.tksc.jaxa.jp/sentinel/

rs.lapan.go.id/SIMBA/

MODIS
LANDSAT
SPOT

" REMOTE AKSES &
NEAR REAL TIME "

(MTSAT)

NOAA

MODIS

Fengyun

Firewall

GATEWAY
SENTINEL ASIA

Hotspot

FDRS

Cloud Cover
ITCZ

Greeness/
NDVI

Database Spasial

Flood
Landslide

(Internal)

PEKAYON GS

**LAPAN – PEKAYON
JAKARTA**

**PUSBANGJA
PUSDATA**

PAREPARE GS

# EMCIS (Emergency and Disaster Communication Information System)
Trial Project

EMCIS (Emergency and Disaster Communication Information System) *Indonesia Trial Project*

- Communication for emergency using VHF for low speed data, voice, and image from disaster areas to the center of disaster management system

- During disaster: Medical officer immediately go to the field with EMCIS equipment (a notebook computer, EMCIS modem, and radio equipment)

- To install the EMCIS system in a car or an ambulance:
  - EMCIS modem connect to notebook via RS-232 and the HT radio. Each HT radio assigned with unique identity number (ID).
  - Medical officer enters medical information (text data or image) of the victims in that disaster area and send to other EMCIS systems, e.g. the disaster center or hospital.

- Place of trial:
  - dr.Slamet Hospital in Garut (servers, applications, database), and 2 remote areas in Kadungora and Cilawu Villages (pre-installed laptops with user applications and communication applications)

Network Configuration
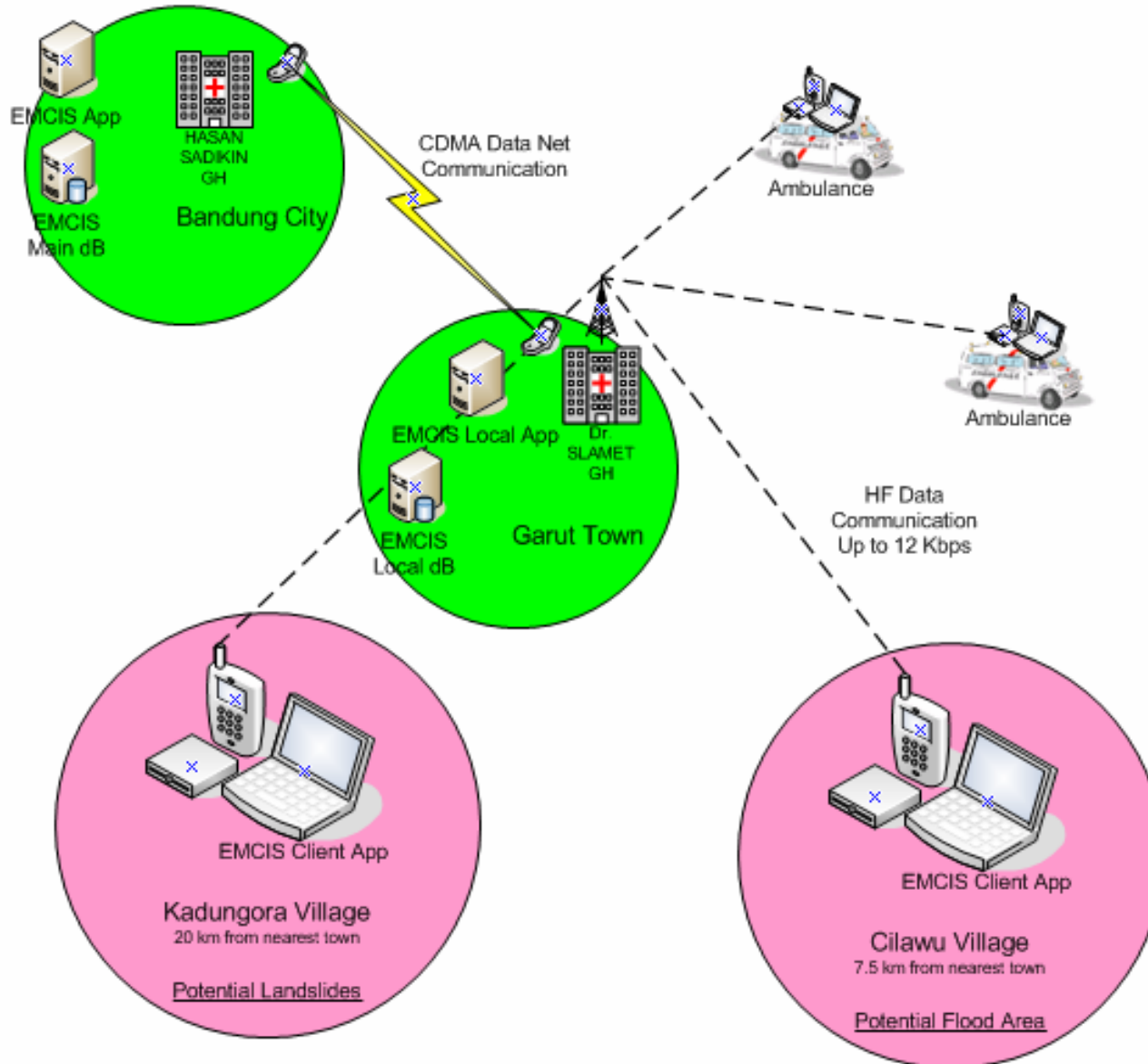
EMCIS Features

- **EMCIS Capabilities**
  - VHF modem (FSK and PCM) for data up to 12 kbps
  - ID based for transferring data to avoid false data reception
  - broadcast method: only equipment with ID code can extract EMCIS data
  - Enabling data chatting: coordination/consultation with local/center hospitals
  - Compact and mobile, easy setup: setup only takes less than 10 minutes

- **System Specification**
  - using 140 – 150 MHz frequency
  - **EMCIS Application/Device**
    - Application user: to input medical records, to send picture, to chat with other medical staffs, and to view the received data
    - Comm. application: to communicate between computer and VHF modem, and to synchronize the transmitted and received data

Patient's Data Details Communicated

Action Plan

- To Determine The Government Focal Point On Disaster Warning

- Establishing Standard Of Procedure (SOP)

- Co-ordination With Indonesian Broadcasters And Telecommunication Providers

- Co-ordination With Related Government Entities And Also Local Authority Including Possible Involving Community Center

- Establish Additional Infrastructure If Necessary