Sixth Plenary Meeting of UN-GGIM-AP

Special Session on
Geospatial Information for Disaster Response

-Case Study on 2016 Kumamoto Earthquake-

Session Introduction

4:00pm-4:05pm, 17th October 2017
The modality of the Special Session (1)

- **The core program** of the 6th Plenary Meeting of UN-GGIM-AP, Kumamoto, Japan

- **Theme**: Actual and potential roles of National Geospatial Information Authorities (NGIAs) in Asia-Pacific towards promoting geospatial information for disaster risk management.

- **Objectives**: Sharing Asia-Pacific NGIAs’ experience for disaster response and hence providing valuable inputs to the guidelines to be developed by UN-GGIM-AP WG2 on Disaster Risk Management.
The modality of the Special Session (2)

- **Case Study Used:** Experiences of Geospatial Information Authority of Japan (GSI) in response to the 2016 Kumamoto Earthquake.
- Case story document (provided in prior)
- Presentations during the Session
- **Moderator:** Dr. Hiroshi Murakami (President of UN-GGIM-AP, Director-General of GSI)
- **Session Structure:** Five parts, on PM 17 Oct. and AM 18 Oct. Each part has presentation sections(s) by GSI and discussion section(s)
### Time and issue table of the Special Session

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The modality of the Special Session (3)

- Participants are expected to engage in discussions on:
  - How to prepare for and response to disasters
  - How to align with stakeholders
  - What kind of geospatial information to be developed and how would it be provided

- Your active participation is the key for the success of the Special Session

- So, sharing of your experiences, opinions, and insight is much appreciated!
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Special Session on Geospatial Information for Disaster Response

-Case Study on 2016 Kumamoto Earthquake-

Part 1: Background

4:05pm-4:45pm, 17th October 2017
Japan’s geography

- An archipelago, on the north-western rim of the Pacific Ocean
- Five main islands
- Latitude 20-45N
- Longitude 120-153E
- Area: 370,000 sq. km
- Population: 125 million
- Climate: temperate wet monsoon zone, with 1,700 - 1,800 mm rainfall a year

Japan’s tectonic setting

- Two Ocean Plates
  - Pacific Plate
  - Philippines Sea Plane
- Two Continental Plates
  - Eurasia Plate
  - North-America Plate
- In convergence zones
  - Earthquakes
  - Volcanoes
- A part of the circum-Pacific “Ring of Fire”

Analysis of magnitude 5.0 and greater earthquakes’ epicenters from 2004 to 2013

Japanese Territorial Occupancy: 0.25%
Earthquakes (>Mw.6) in and around Japan: ca. 20%

Global distribution of volcanoes

Numbers of World Volcano: ca. 1,500
Active Volcanoes in Japan: 111 (7% of share)

Ref: http://www.bousai.go.jp/1info/pdf/saigaipamphlet_je.pdf
Tropical cyclone tracks between 1985 and 2005

Annual Typhoon Hits in Japan: 2.6 times

So many disasters hit Asia-Pacific region including Japan

- Earthquakes
- Tsunamis
- Typhoons
- Landslides
- Floods
- Volcanic Eruptions
- Storm Surges
- Forest Fires etc.
Legal framework

• The Basic Act on Disaster Control Measures (1961)
• It stipulates:
  • Disaster Prevention Schemes
  • Disaster Prevention Planning
  • Measures necessary for
    • Disaster preparedness
    • Emergency disaster response
    • Recovery and Reconstruction
  • Role of national and local governments
• GSI is one of the 24 Designated Government Organizations (DGOs) under the Act.
Hierarchy of disaster management planning

Disaster Control Measures
  Basic Act

Basic Disaster Management Plan

Central Disaster Management Council (CDMC)
  (Chair: Prime Minister)

Prefecture Disaster Management Plan (47)

DGO’s Disaster Management Operation Plan (24)

Municipal Disaster Management Plan (>1,800)

National

Local
When a large disaster occurs

Disaster Management Office

Disaster Management Headquarters (DMHQ)

Prefecture DMHQs

Municipal DMHQs

Initial Report of a disaster

If the disaster is so large

Operation by DGOs

Investigation Team

On-site Disaster Management Headquarters (ODMHQ)
Three helps for disaster resiliency

• **Self-help**
  • Protect lives by themselves

• **Mutual-help**
  • Protect lives by communal cooperation

• **Public-help**
  • Protect lives by public agency (i.e. police, firefighters etc.), **a limited capacity at a large disaster**
Importance of mutual-help

• People’s consciousness changed after Great East Japan Earthquake in 2011
• Disaster drills at schools, workplace and communities
• Storing emergency goods (foods, flashlights etc.)
• Volunteered “disaster prevention corps”, with 860,000 members

**Geospatial Information Authority of Japan (GSI)**

- **A Government Organization**

  - **Cabinet** → **Ministry of Land, Infrastructure, Transport and Tourism (MLIT)** → **Geospatial Information Authority of Japan (GSI)**

- **History**
  
  - 1869: Cadastral Map Section, Ministry of Civil Service
  - 1888: Japanese Imperial Land Survey, General Staff Office
  - 1945: GSI, Ministry of Home Affairs
  - 1948: GSI, Ministry of Construction
  - 2001: GSI, MLIT

- **Functions**
  
  (+) National geodesy & mapping, Disaster Risk Management, SDI policy & promotion
  
  (-) Cadastral, land & real estate mngt., hydrography

- **GSI HQ in Tsukuba**
Where are GSI functions?

- Hokkaido region (Sapporo)
- Tohoku region (Sendai)
- Kanto region (Tokyo)
- Chubu region (Nagoya)
- Kinki region (Osaka)
- Shikoku region (Takamatsu)
- Kyushu region (Fukuoka)
- Chugoku region (Hiroshima)
- Hokuriku region (Toyama)

Okinawa region (Naha)

You’re here in Kumamoto
How GSI responds to disasters

Survey Act

Disaster Control Measures Basic Act (enacted in 1961)

Based on

Basic Disaster Management Plan

National level

Based on

GSI: one of the 24 DGOs under the act

Based on

GSI Business Continuity Plan (BCP)

Supplement

GSI Disaster Mgmt. Operation Plan

Based on

Relationship

Long-term plan of Basic Survey

Established practice

GSI Disaster Mgmt. Operation Manual

Established practice

Disaster related activities (Earthquake, Volcanic eruption, Flood, Landslide, Storm surge etc.)
Preparation measures for disasters (1)

Maintain Geodetic Infrastructure Healthy and Ready

CORS Network (GEONET)

Quick acquisition of crustal movements by an earthquake

Check and Maintain
Physical Structure
Auxiliary Battery
Communication System
GNSS Receiver etc.

24 CORSs in Kumamoto Prefecture
Preparation measures for disasters (2)

Keep Digital Japan Basic Map always updated

Mapping by photogrammetry

Spot Mapping for Infrastructure Update

Keep Basic Map Always Fresh

- Get common operational pictures
- Make right decision during disaster response
Preparation measures for disasters (3)
Provision of disaster risk related geospatial information

Active Faults
Volcanic Landform
Shaded Elevation

Lowland Landform
Evacuation Places
Hazard Map Portal

Thematic Info. for local governments and residents
Preparation measures for disasters (4)
Partnership agreement with local governments etc.

- Kumamoto Prefecture (2015-)
- Kumamoto City (2014-)
- Kyushu Regional Dev. Bureau / MLIT (2011-)
Preparation measures for disasters (5)

Disaster drills at government-wide and GSI-alone

Government Tsunami Response Drill

UAV Pilotage Drill in GSI

Demonstration GSI Survey Aircraft

DMHQ Operation Drill in GSI
Preparation measures for disasters (6)
Public relations activities
Preparation measures for disasters (7)

Securing air-photo taking capability

- GSI owns one survey aircraft, sufficient for a small disaster
- Just one aircraft cannot cover the whole affected areas of a large disaster (e.g. 2011 Great East Japan Earthquake)
Preparation measures for disasters (7)

Securing air-photo taking capability

• To solve this, GSI made a partnership agreement with the association of areal survey companies for emergency photography
Sudden surge of demand poses a challenge: changing time-management paradigm

How can we quickly mobilize necessary resources including those outside the organization to change the mode of operation from normal to emergency?
Topics for discussion #1

• What kind of domestic legal bases are in your country to mandate NGIAs to take action for disaster risk management?

• What kind of preparation measures should NGIAs take before the occurrence of a disaster?
  ➢ in order to allow the government and people to get well prepared for future disaster; and
  ➢ to meet sudden surge of demand for up-to-date geospatial information of the stricken areas
You are now in Kumamoto
The time is supposed to be 9:25pm, 14 April 2016 (Thursday)
-Just before the first shock-