

The Second UN-GGIM-AP Plenary Meeting

# NGIAs' roles in successful disaster response

*Japan*

Teheran Iran  
28 October 2013

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Director of International Affairs Division  
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## Outline

- Type of Disasters Occur in Japan
- Practical Examples for Type of Disasters
- Mandate Given to NGIA for Disaster Management
- Practical Examples of Measures Taken for Disaster Management by NGIA
- Type of Data Developed and Provided
- Equipment or Technical Methods used by NGIA for Disaster Management.
- Factors Contributing to Effective Disaster Preparedness by NGIA
- Users of NGIA's Data and Services
- Cooperation with Related Communities for Disaster Management
- Kinds of Data/Services NGIAs Should Deliver to the Communities
- Role of UN-GGIM-AP in Disaster



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## Type of Disasters Occur in Japan

- **Earthquake**
- **Tsunami**
- **Volcanic Eruption**
- **Flood**
- **Landslide**
- **Storm**
- **Heavy Rain**
- **Heavy Snow**
- **Tornado**

*Like a shopping mall*



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## Practical Example for Earthquake

- the Great East Japan Earthquake on March 11<sup>th</sup>, 2011

- **Earthquake:**
  - Mw: **9.0**
  - Ground surface movement (max):  
**5.3m** (horizontal), **-1.2m** (vertical)
- **Tsunami:**
  - Highest elevation reached: **43m**
  - Inundated areas: **561 square km**  
(approx. 10 times of the Manhattan Island in New York)
- - 15,883 people dead, 2,654 people missing
- **Land Slide**
- **Liquefaction Damage**



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## Mandate Given to NGIA for Disaster Management

- **Basic Act on Disaster Control Measures**

- To protect land and property of the country/people from hazards by making necessary institutional arrangements and other measures including financial provisions
- 24 designated organizations in the Government including GSI
  - mandated to develop and implement disaster prevention plan
  - mandated to gather and share information on disasters, while **maximizing the use of geospatial information**.

Amended after  
3.11 Earthquake



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## Practical Examples of Measures Taken for Disaster Management by NGIA

### What GSI did at 3.11 Earthquake in Emergency Response Phase

- Provision of maps of affected areas
  - Immediately (< 1h) provide to Government offices starting from small-scale maps (1:500k)
- Detection and analysis of ground surface movement with GNSS control point network
- Aerial Survey (Aerial photos + Ortho images)
  - Photo interpretation and measurement of damaged areas



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## Practical Examples of Measures Taken for Disaster Management by NGIA

### **What GSI did at 3.11 Earthquake in Recovery Phase(+1-2 months -)**

- Resurvey for new coordinates of geodetic control points
  - Resurvey of horizontal and leveling control points
  - Revision of coordinates of control point network origins (horizontal & vertical)
  - Distributing survey results of control points
- New mapping of damaged areas
  - 1:2,500 scale mapping for reconstruction planning



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## Type of Data Developed and Provided

- Base Maps (paper and digital)
- Data of Ground Surface Movement with GNSS Control Point Network
- Aerial Photos and Ortho Images
- Disaster Overview Maps
- Thematic Maps (e.g. Tsunami Inundation Mapping)
- Correction Parameters for Horizontal Control Points
- Recovery Planning Maps

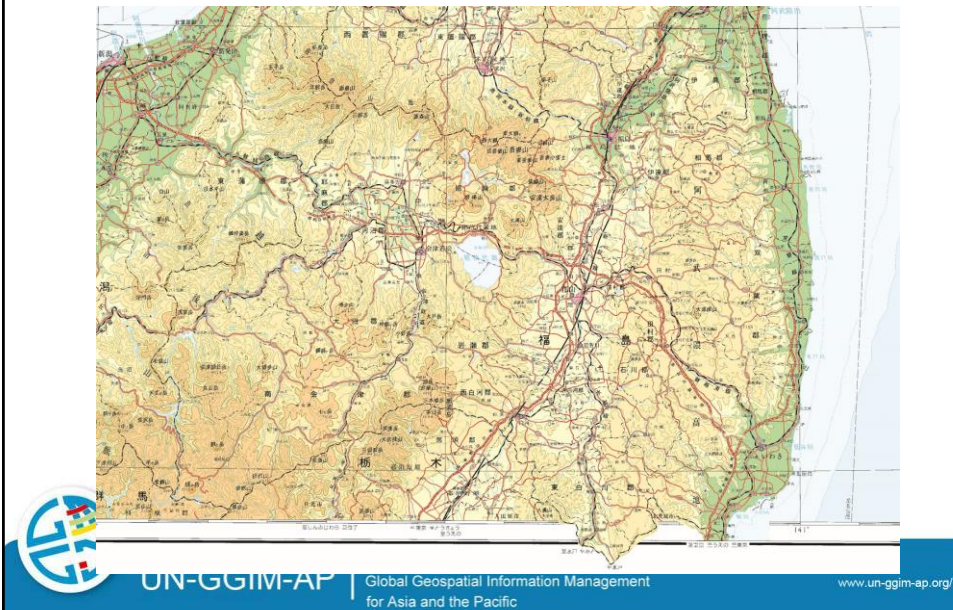


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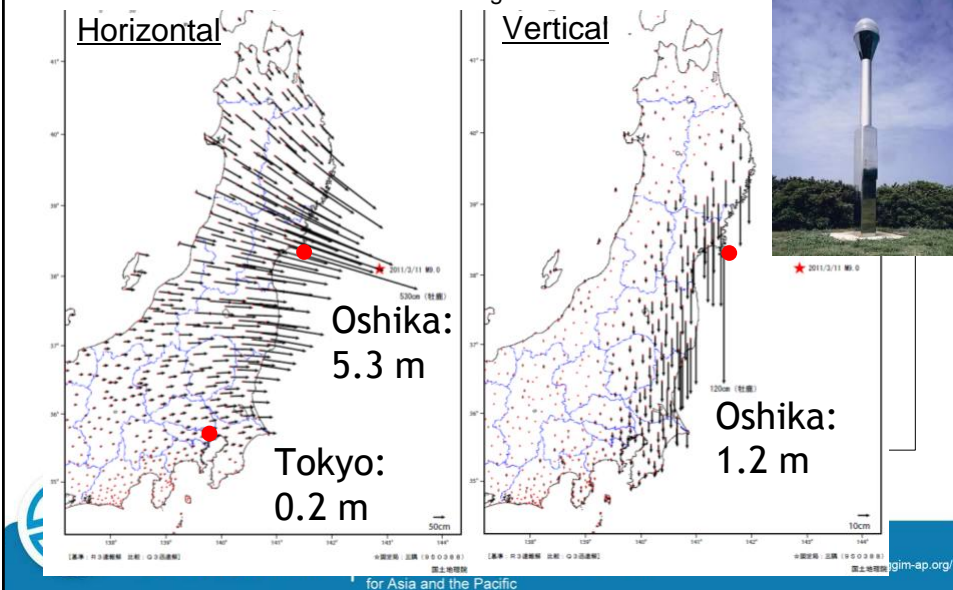
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## Provision of Base Maps (< 1 hour)



## Ground Surface Movement (+ 5 hours -)

GNSS based control stations observed large crustal movement





## Aerial Photos (+ one day ~)

Take aerial photos of major damaged area in a few days



## Disaster Overview Maps of Traffic Network



## Tsunami Inundation Maps

浸水範囲概況図 No.81



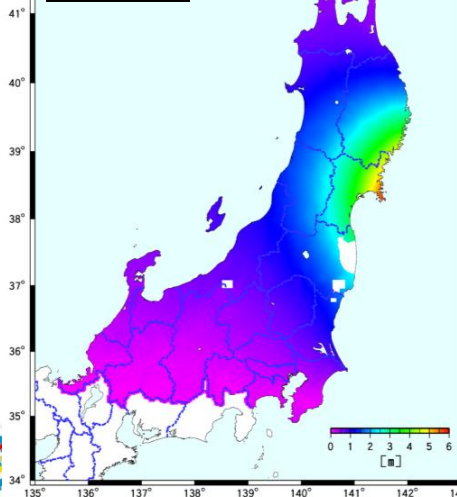
Inundation Areas by Photo Interpretation

N 38:41.09.33 E 141:28:26.69

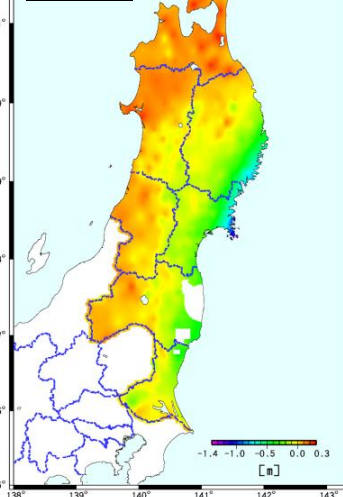


## Correction Parameters for Horizontal Control Points

Horizontal



Vertical



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## Recovery Planning Map

1:2,500 base map in support of reconstruction planning

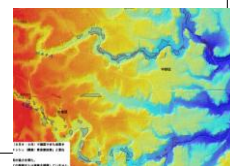
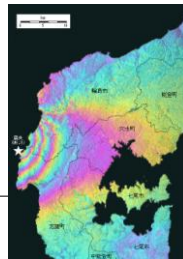


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## Equipment or Technical Methods Used by NGIA for Disaster Management

- Detection and analysis of ground surface movement with GNSS control point network and In SAR analysis
- Fault Modeling and Observation of Post Seismic Slow Slip
- Triangulation Survey and Leveling survey
- Aerial Survey (Aerial Photographs, Ortho Images and Photo Interpretation)
- Airborne Laser (DEM and 3D Maps)
- Mobile Mapping System (MMS)
- Thematic Mapping



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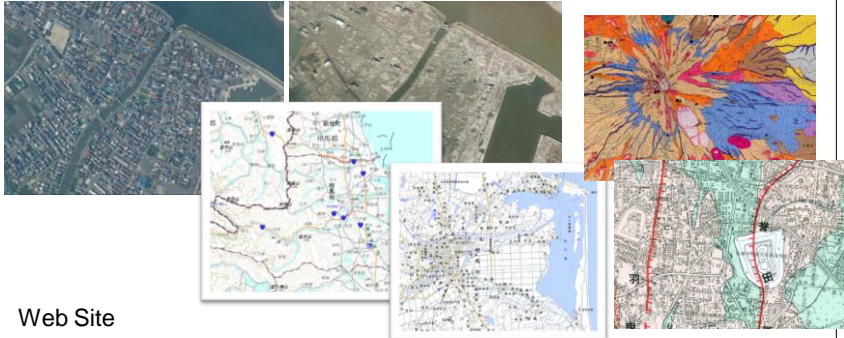
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## Factors Contributing to Effective Disaster Preparedness by NGIA

- Archive Data (Aerial Photos, Base Maps and Thematic Maps...)



- Web Site
- Preparation of Data Distribution Routes to Government Organizations
- Disaster Drills for cooperation with government organizations



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## Users of NGIA's Data and Services

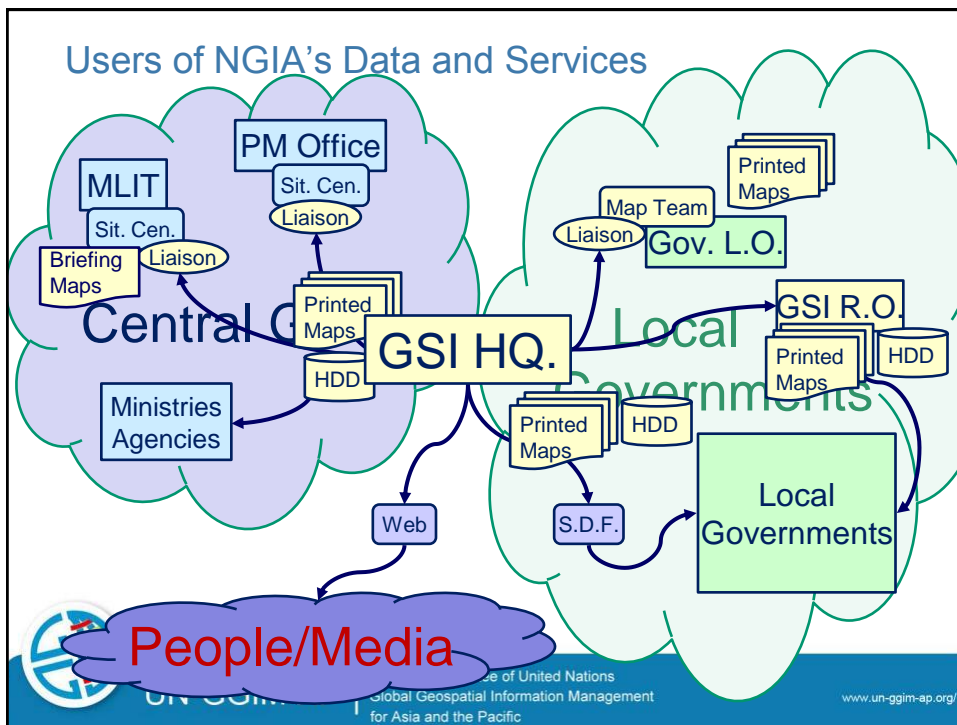
- Central Government Offices
  - Prime Minister's Office
  - Ministry of Land, Infrastructure, Transport and Tourism
  - Relevant Ministries and Agencies
- Local Governments affected by the disaster
- General Public and Mass Media
- Researchers



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## Cooperation with Related Communities for Disaster Management

- Dispatch of Liaisons to Operational Offices and to the affected areas
  - GSI send staffs as liaisons to the relevant administrative organizations. They understood the needs of relevant administrative organizations and GSI played a major role in providing maps and geospatial information required by the disaster response.
- Geospatial Information Support Team in GSI
  - One stop center at GSI HQs in the disaster response
  - 1,537 requests (by 2012/3/31) at 3.11 Earthquake
  - Provision the geospatial information effectively and easily understood properly
- Cooperation with the aerial survey companies in the disaster response
  - Emergency Aerial Photography

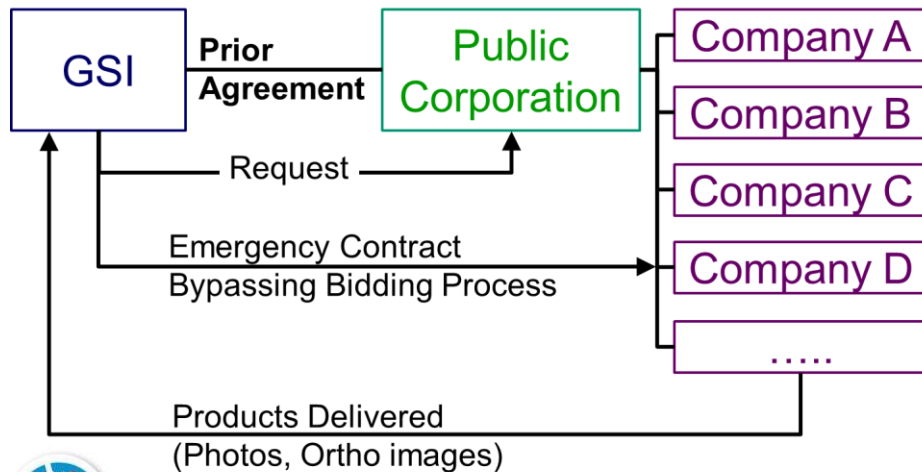


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## Arrangement for Emergency Aerial Photography



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## Kinds of Data/Services NGIAs Should Deliver to the Communities

- NGIA should deliver the data/services that enlighten policy makers and government officials on utilization of the geospatial information in disaster management.
- Such data/services should provide common tools for utilization of the geospatial information in disaster management.
  - Base Maps (paper and digital)
  - Data of Ground Surface Movement with GNSS Control Point Network
  - Aerial Photos and Ortho Images
  - Disaster Overview Maps
  - Thematic Maps
  - Correction Parameters for Triangulation Points
  - Recovery Planning Maps etc.



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## Role of UN-GGIM-AP in Disaster Management

- Share the NGIA's Experiences of Disaster Management with the Asia-Pacific countries
  - Share the Disaster Information of Maps and Photos etc. with the Asia-Pacific countries
  - Consultant of Technology Transfer on Disaster Management
- 
- ◆ NGIA should (and can) contribute more in the stage of rescue and recovery.
  - ◆ GSI has many experiences and know-how, especially against earthquake, volcano eruption and flood. GSI can share these experiences, so we welcome you to contact to us.



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