Geospatial Information Availability for Disaster Mitigation in Taiwan

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Contents

- I. Background
- II. Geospatial Technology
- III. Examples
- IV. Suggestions



Background

Taiwan might be the most vulnerable to natural hazards on Earth, with 73% of land and population exposed to three or more hazards (World Bank, 2005. "Natural Disaster Hotspots-A Global Risk Analysis")

Countries Most Exposed to Multiple Hazards

Three or more hazards (top 15 based on land area)

Country	Percent of Total Area Exposed	Percent of Population Exposed	Max. Number of Hazards	Country	Percent of Total Area Exposed	Percent of Population Exposed	Max. Number of Hazards
Taiwan	73.1	73.1	4	Vietnam	8.2	5.1	3
Costa Rica	36.8	41.1	4	Solomon Islands	7.0	4.9	3
Vanuatu	28.8	20.5	3	Nepal	5.3	2.6	3
Philippines	22.3	36.4	5	El Salvador	5.1	5.2	3
Guatemala	21.3	40.8	5	Tajikistan	5.0	1.0	3
Ecuador	13.9	23.9	5	Panama	4.4	2.9	3
Chile	12.9	54.0	4	Nicaragua	3.0	22.2	3
Japan	10.5	15.3	4				



Geospatial Technology

- Acquisition & Processing
- Modeling & Analyses



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Acquisition & Processing

- <u>Spaceborne</u>
- <u>Airborne</u>
- DEM & Photomap



• Spaceborne

- Formosat-2
- Satellite Ground Receiving Station



 Formosat-2
(1) 24km Swath
(2) 2m GSD (Panchromatic) 8m GSD (Mulit-Spectral)
(3) Daily Revisit



US-Taiwan MC/MD Workshop May 6-7, 2010

2m Panchromatic

2m Color Fusion Taipei © NSPO/ CSRSR, 2004





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8m Multispectral

Ø558SE

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Satellite Ground Receiving Station

- (1) Since 1993 at NCU
- (2) SPOT-series, FORMOSAT-2(Back UP), MODIS, ERS/ENVISAT













Airborne

- Digital Cameras
 - 1. **Z/I, DMC *3**
 - 2. Vexcel, Ultracam *2
 - 3. Leica, ADS *1
- Lidar Systems
 - 1. **Optech *2**
 - 2. **Leica *2**
- > SAR
 - 1. 1m Resolution
 - 2. To be Operated



- DEM
 - 1. Revised Version (2008)
 - 2. 5m Resolution
 - 3. <1m Elevation Error
 - 4. Derived form Stereo Photogrammetry

• Topomap

- 1. 1/1,000 for Urban Areas
- 2. 1/5,000 Photo Basemap for Entire Taiwan



Modeling & Analyses

- Cyber City Modeling
- <u>Simulations</u>













Building Damage Potential by Earthquakes



Medium damage probability:50~100%

Medium damage probability:60~100%



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Building Damage Potential by Earthquakes



Severe damage probability:20~100%

Severe damage probability:50~100%₁₅



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Examples in Disaster Survey

- Post Chi-Chi Earthquake
- Typhoon Morakot





Yearly Increment of Landslides



Accumulated Landslides





- Suggestions
 - Integration
 - Data
 - Information and Domain Knowledge
 - ♦ Fast Response
 - Mechanism
 - Validation
 - ♦ More ?

Thank you!

