DLRs Earth Observation Activities for Risk- and Vulnerability Assessment

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Crisis Management

- Increasing demand for timely information on the status of
  - Natural disasters
  - Humanitarian relief
  - Immanent threats to the population

- Establishment of a DLR center (ZKI)

Center for Satellite Based Crisis Information
– Emergency Mapping & Disaster Monitoring –

a service of DFD
Civil Security & Emergency Response

Demand for Information on

- Natural Disasters and Humanitarian Relief Missions
- Immanent threats for the Population
Risk = f(Hazard, Vulnerability)

Where are exposed areas?
What would be affected?
How many people would be affected?
How large will be the damage?
Risk = f(Hazard, Vulnerability)

- Where are exposed areas?
- What would be affected?
- How many people would be affected?
- How large will be the damage?
Hazard assessment

Slope Analysis – Rio de Janerio

Legend:
- High: 5
- Low: 0
Where are exposed areas?

- monitoring of mega city Cairo, Egypt
Risk = f(Hazard, Vulnerability)

Where are exposed areas?
What would be affected?
How many people would be affected?
How large will be the damage?
Example:
District Zeytinburnu, Istanbul
Land cover
Urban Morphology

- Building types
  - Height, Size, Age,
    Roof type, Structure,
    etc.

Building height in floors:
Risk = f(Hazard, Vulnerability)

- Where are exposed areas?
- What would be affected?
- How many people would be affected?
- How large will be the damage?
Population assessment

Population [In/km²]

- 1 - 1000
- 1001 - 5000
- 5001 - 10000
- 10001 - 20000
- 20001 - 30000
- 30001 - 40000
- 40001 - 50000
- 50001 - 60000
- 60001 - 100000

At day-time

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Risk = f(Hazard, Vulnerability)

Where are exposed areas?
What would be affected?
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How large will be the damage?
Result

- Assessment of damage grades
- Earthquake scenario

Probable damage grades [%]

- 0.4847
- 0.2867
- 0.2056
- 0.1704
- 0.2626
- 0.0676
Risk = f(Hazard, Vulnerability)

Timeline

Pre-disaster
Where are exposed areas?
What would be affected?
How many people would be affected?
How large will be the damage?

Disaster Event
What is the current situation?

Post-disaster
Center for Satellite Based Crisis Information
– Emergency Mapping & Disaster Monitoring –

BANGLADESH - DHAKA City and Outskirts

1:50,000

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DLR-ZKI – sample products during Charter calls

- Tropical cyclone, Myanmar, 2008
- Forest fires, Greece, 2006
- Earthquake, Yogjakarta, 2006
- Land slide, Philippines, 2006
- Marine oil spill, Lebanon, 2006
- Floodings, UK, 2007
- Tropical cyclone, Bangladesh, 2008
Operational Service of DLR - Fire Monitoring Europe

Example from 02. June 2009
Risk = f(Hazard, Vulnerability)

Where are exposed areas?
What would be affected?
How many people would be affected?
How large will be the damage?

What is the current situation?

Which reaction is necessary?
How can rehabilitation be organized?
THAILAND / Northern Khao Lak Bay

IKONOS - January 30, 2003 - PRE-DISASTER IMAGE

IKONOS - December 29, 2004 - POST-DISASTER IMAGE

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Risk = f(Hazard, Vulnerability)

- Where are exposed areas?
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- How large will be the damage?
- What is the current situation?
- Which reaction is necessary?
- How can rehabilitation be organized?
Reaction and rehabilitation management

Stable buildings
Summary – DLRs Earth Observation Activities for Risk- and Vulnerability Assessment

Timeline

Pre-disaster

Disaster Event

Post-disaster

Where are exposed areas?

What would be affected?

How many people will be affected?

How large will be the damage?

What is the current situation?

Which reaction is necessary?

How can rehabilitation be organized?

RISK ASSESSMENT

AD-HOC COORDINATION

DISASTER MANAGEMENT

Center for Satellite Based Crisis Information
Emergency Mapping & Disaster Monitoring

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Thank you very much for your attention!