INNOVATING TO COMPETE - OPPORTUNITIES FOR ITALY AND JAPAN - “2009 Edition”

Working Group “Natural Disaster Management”

Risk management, emergency response and humanitarian aid through geospatial information solutions
Objective

Improve Italian and Japanese capabilities to manage natural disaster management, emergency response and humanitarian aid through geospatial information services. Demonstration in Italy, Japan, and a third country.

Motivation

Italy and Japan share similar land and socio-economic features: small territory with large population, geology, morphology, that imply very similar geospatial information needs for managing geo-hazards.

Assets

Italy and Japan are world leaders in

✓ natural disaster management
✓ satellite EO sensors (ALOS and COSMO-SkyMed) and satellite operation
✓ geospatial information services.
## ALOS and COSMO COMPLEMENTARITIES

<table>
<thead>
<tr>
<th>ALOS</th>
<th>COSMO-SKYMED</th>
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<td>1 satellite SAR L-Band</td>
<td>4 satellites SAR X-Band</td>
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- **ALOS**
  - Better suited for interferometric analysis of large areas with few images
  - L-band, which guarantees interferometric coherence also in vegetated areas and is less sensitive to atmospheric effects
  - Larger swath which allows for large areas monitoring

- **COSMO-SKYMED**
  - High resolution allowing more localized observations and larger number of persistent scatterers
  - X-band, which is more sensitive to terrain displacements
  - Four satellites, which allow very high frequency of revisit time and high acquisition capacity
ALOS and COSMO INTEGRATION

ALOS
- Large areas
- Low spatial resolution
- High coherency
- Regular monitoring

COSMO-SKYMED
- Target acquisitions
- High spatial resolution
- Very frequent revisit
- Intensive observation period
Natural Disaster Management - Italian and Japanese platforms

EO National Platforms
- COSMO (VHR SAR)
- GeoEye-1
- IKONOS
- ALOS (SAR)
- AIRPLANE (VHR Optical)

Additional EO sources

Geospatial Platforms
- Italian SDI
- Disaster prevention Mash Up System (led by GITA JAPAN)

Italy NDMS

Japan NDMS
Pilot Project “Geo-HS”

Approach

✓ Driven by the Users:
  - Italy and Japan Civil Protections, other Institutions (transportation, …)
✓ Services developed and validated with the users in previous national and international projects
✓ Modular approach:
  - focus on sub-sets of phenomena
  - areas of interest (from small area to a whole country)
  - duration of service

Activities

✓ Continuous monitoring and detecting changes by Satellite data
✓ Integration with geospatial database service platforms
✓ Integration with user operational chains: COSMO to be integrated in Japanese service chain, ALOS to be integrated in Italian service chain
✓ Service demonstration in three sites: Japan, Italy, and a third Country
Geo-Hazard Services: ground movement and change detection

✓ earthquakes
volcanoes
subsidence
landslides
infrastructure stability
railways network monitoring
rapid mapping

Red: SAR detected amplitude image - 2009, April 14th
Green: SAR detected amplitude image - 2009, April 05th
Blue: SAR coherence value

Change detection after L’Aquila earthquake to identify damages and to monitor rescue activities
Geo-Hazard Services: ground movement and change detection

- earthquakes
- volcanoes
- subsidence
- landslides
- infrastructure stability
- railways network monitoring
- rapid mapping

Vesuvius – monitoring of deformations induced by the volcanic activity
Geo-Hazard Services: ground movement and change detection

- earthquakes
- volcanoes
- subsidence
- landslides
- infrastructure stability
- railways network monitoring
- rapid mapping

Pescara, Italy. Monitoring urban subsidence due to natural and anthropic activities
Geo-Hazard Services: ground movement and change detection

- earthquakes
- volcanoes
- subsidence
- landslides
- infrastructure stability
- railways network monitoring
- rapid mapping

Maratea, Italy - Landslides risks analysis and inventory mapping
Geo-Hazard Services: ground movement and change detection

- earthquakes
- volcanoes
- subsidence
- landslides
- ✓ infrastructure stability
- railways network monitoring
- rapid mapping

Campolattaro dam (Italy): very high resolution DIFSAR analysis for stability monitoring of strategic infrastructures
Geo-Hazard Services: ground movement and change detection

- earthquakes
- volcanoes
- subsidence
- landslides
- infrastructure stability

☑ railways network monitoring

rapid mapping

Sochi Bridge (Russia): VHR DIFSAR analysis for railways network control
Geo-Hazard Services: ground movement and change detection

- earthquakes
- volcanoes
- subsidence
- landslides
- infrastructure stability
- railways network monitoring
- ✓ rapid mapping

Rome (Italy): flooded areas identification
Mash-Up System: Platform for integrating & distributing geospatial information

Academic Institutions

Data providers

Software Vendors

Electricity and GAS

Transportation

Telecommunication

Geospatial Information MASH-UP

IKONOS ONLINE

Designated Administrator

Local Governments

Police, Firefighters

Civilians

Other private companies

NPO
Example of Mash-Up System, overlaying the thematic map on the interface

Railway facility map & magnitude distribution

Provided by J RC
The Italian public policy to cope with risk assessment and management

Operational interface (including geospatial platform) of National System of Civil Protection

Population needs and requirement

Responsibility interface

Hazard evaluation

Risk evaluation and reduction through civil protection early warning system and actions

Operational interface

Central, regional and local Authorities

Universities and researcher centres

Technical and scientific bodies, agencies and service providers

National System of Civil Protection

Aims and Political bodies

Evaluation of the induced consequences on human life and goods

High technology industries
EO products for L’Aquila earthquake in the geospatial platform
A cooperative Italian/Japanese project

“Geo-HS” - Geo-Hazard Services

A cooperative Project proposed by Italy and Japan to support risk management, emergency response and humanitarian aid through geospatial information services.

✓ Driven by Institutional Users
✓ Based on existing geospatial capabilities and integration of Japanese/Italian EO Platforms (ALOS/COSMO)
✓ Distribute the data on the common and user friendly platform via internet
✓ To cover specific hazards in test areas in Italy, Japan and a third country
✓ The project can be the stepping-stone to promote global size business opportunity for Italy and Japan
✓ Project can start within 2009 with a duration of 6-12 months (costs in the range 0.5 – 1.0 M$)