Spatial data infrastructures to support emergency management:

A European perspective

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Spatial data infrastructures: Why?

- Information society – Informed public Participation – Access to high quality information
- Accessibility to geographic information is essential
- Location of data
- Whether data fits the needs
- How is it accessible ...

- Need to place a framework of policies, institutional arrangements, technologies, data...

To promote dissemination and use of GI !

Spatial data infrastructures (cont.)

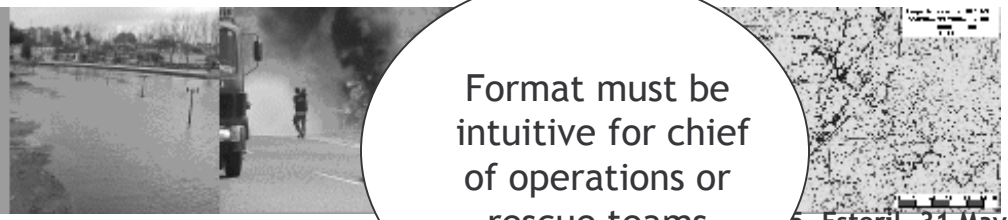
- European level: The beginnings – INSPIRE
  - Basic principles:
    - Data should be collected once and kept where it can be better updated
    - Discussion about data formats to promote combination of data from multiple sources; users and applications
    - Easiness to discover where data is, its characteristics and conditions of accessibility (priced or not) and its conditions

- National level: The Dutch NCGI or Portuguese SNIG, or at regional or local

Emergencies

- Emergencies are intrinsically spatial events changing over space and time
- Origin: Natural or technological
- Type:
  - Serious accidents (sudden unforeseen; limited effects)
  - Calamities (sudden unforeseen; cause victims, affect people's welfare disrupt condition's of life and socio-economy
  - Catastrophes (event or series of events with prolonged effects in time and space)
- Hazards are associated with a probability of risk and can be spatially delineated

Emergency cycle: needs for data



Format must be intuitive for chief of operations or rescue teams

Combat Search and Rescue

Rapid output
Topographic maps
Location of basic infrastructure:
itals, shelters,
outes;
st paths;

Discussions over:
- Formats, standards and information needs
- Open spatial data infrastructures

...

Mitigation and Preparedness

Vulnerability analysis
Facility location planning
Mitigation of impacts
Critical buildings
Utilities (gas, water...)
...

Rehabilitation

Census and demography, health, camp organisation, water, sanitation, ...
Rehabilitation of infrastructure (roads, gas...)

Cutter, 2003

SDI's for emergency management

- Traditionally data is created:
  - for the purposes of data producers
  - following owner's specifications (ex.: reference systems, scales) and formats
- Emergency community needs data:
  - Updated
  - From different sources
  - At specific formats, according to emergency type, and phase in emergency cycle
- Emergency management is a multi-user environment combining actors from different organisations and backgrounds

SDI's for emergency management (cont.)

- SDI's for Emergency Management : frameworks combining data producers
  - Common understanding on users needs
  - Formats are discussed in advance
  - Representations of data to suit multi-user environment
  - Data is kept with producer where it can be maintained and available through the network

Emergency management (Response phase)

- During response phase (emergency changes rapidly over time, decisions are quickly taken):
  - GI should be available by location of the emergency
  - Provide context to teams in the field and support decisions at command level
- Multi-user environment (different fields of expertise)
  - Different needs for data
- Botlenecks: Computer (or systems illiteracy)
  - Several systems (alert and/or assessment): need specific operators to handle
- Spatial Data should be integrated in information system and queried upon location

European initiatives

- Discussions upon the importance of:
  - integration and standardization of geo-spatial data and analytical tools
  - recognition of the important role of the user community
- Need for
  - (1) Function specific control rooms
  - (2) Mobile command centres
  - (3) Connected to the crew in the field

Ex.: Dutch organisation

- In Portugal: The Emergency Information Network (scrif.igeo.pt)
- EU sponsored projects OASIS and ORCHESTRA aiming at
  - Define common ontologies for emergency management
  - improve geospatial info and standards for dealing with risks

Global Monitoring for Environment and Security

- Joint initiative of the European Commission and the European Space Agency
  - Contribute to security of citizens
  - Providing information support to decision-makers and operations officers (civil protection teams)
  - Focus on infrastructure (common standards, formats, etc)
  - Also on geo-referenced information needs for emergency management
  - And system's interoperability

LBS for DM

- Emergencies evolve rapidly in time and space
- Spatial data provides context for emergency management at local level
  - Need to dynamically receive data
  - According to the position of rescue worker
  - Using intuitive interfaces

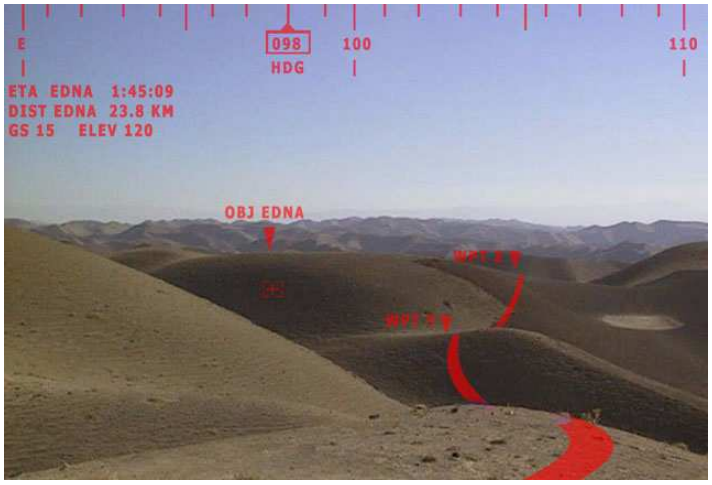
- Position
  - Precisions may range from 1 to 10 meters
  - Cell-id, GPS

LBS for DM (cont)

- Devices

PDA, tablet PC's, Mobile phones

Goggles ex.: augmented reality



– Systems embeded in the user's suits

LBS for DM (cont)

- Communications technology
  - *Wi-fi*, GSM, GPRS, UMTS, satellite...
  - Vary according to user's profile and role
- The Dutch P-Info
  - Wireless information service
  - Police
- Undercover 2: Merc Wars
  - Information system handles thousands of concurrent users
  - Centre line data
  - Location based game

Conclusions

- Spatial Data infrastructures essential infrastructures for disaster management
  - Keeping information with the data producer ensures data quality
  - Organisations will better understand needs of emergency community
  - Enhance systems interoperability
  - Improve communication

Conclusions

- Location based services will enhance emergency services performance in the field
- The first conferences on the role of geo information for disaster management show the rising interest in this topic.
- Coordination will be crucial.
- The geographical dimensions of emergencies are not bounded at all by administrative boundaries.