Challenges in data management during disasters

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isprs
information from imagery

- www.isprs.org
- The International Society for Photogrammetry and Remote Sensing (ISPRS) is a non-governmental organization devoted to the development of international cooperation for the advancement of photogrammetry and remote sensing and their applications.
- Photogrammetry and Remote Sensing is the art, science, and technology of obtaining reliable information from non-contact imaging and other sensor systems about the Earth and its environment, and other physical objects and processes through recording, measuring, analyzing and representation.
- Centenary celebrations, 4th of July, 2010 Vienna, Austria
- Member of the JB of GIS

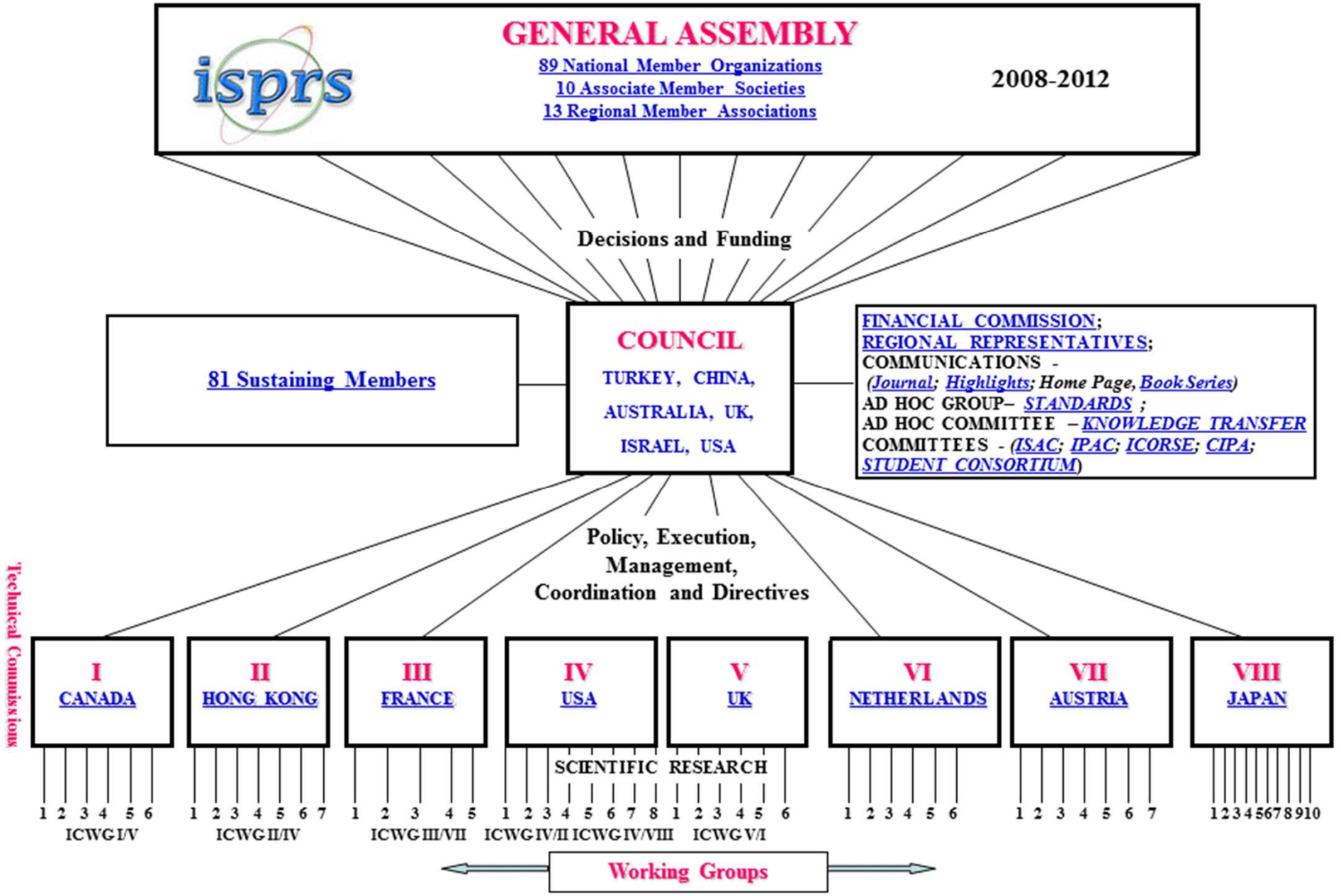
Structure 2008-2012

information from imagery

- 8 commissions
- 55 working groups
- Every 2 years commission symposiums (2010)
- Every 4 years a congress (XXII, 25 August - 1 September 2012 Melbourne)

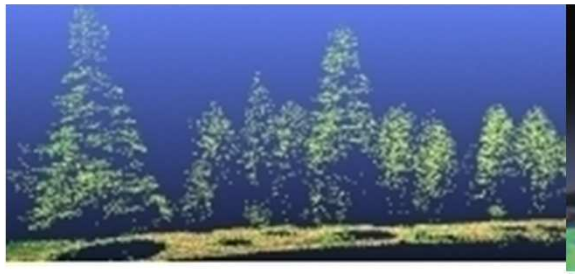
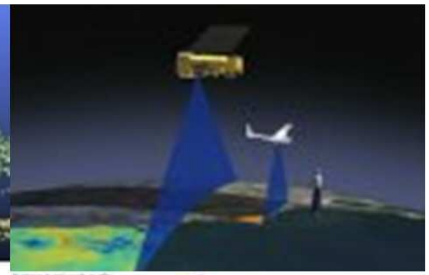
www.isprs.org

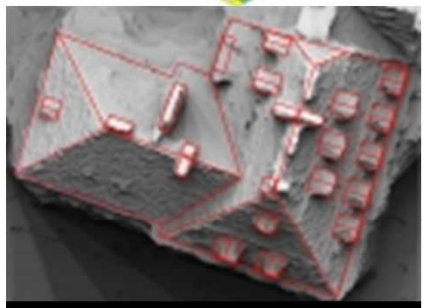
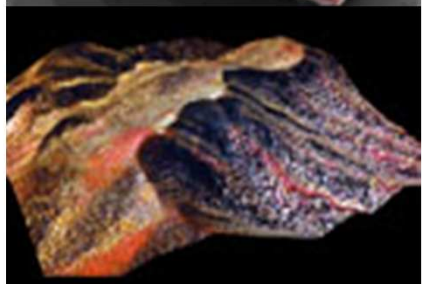
- Conferences, workshops, working meetings
- ISPRS proceedings (to be indexed)
- ISPRS book series (Taylor&Francis)
- ISPRS journal, open-access GIS journal



"ISPRS is a Society of National Societies and Organizations"

ISPRS and 3D geoinformation


Com I: Image Data Acquisition - Sensors and Platforms

Com II: Theory and Concepts of Spatial Information Science

Com III: Photogrammetric Computer Vision and Image Analysis

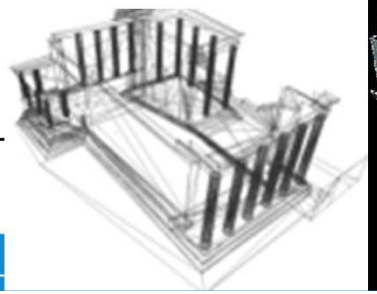
Com IV: GSeodatabases and Digital Mapping

Com V: Close-Range Sensing: Analysis and Applications

Com VI: Education and Outreach

Com VII: Thematic Processing, Modeling and Analysis of Remotely Sensed Data

Com VIII: Remote Sensing Applications and Policies



ISPRS WGIV/8 (2008-2012)

3D Spatial Data Integration for Disaster Management and Environmental Monitoring

- 3D models (geometry, topology, semantics, appearance) for sharing data from different domains (topography, geology, climate, ocean; BIM, AEC, GIS)
- 3D models for seamless (indoor/outdoor) navigation and evacuation
- 3D models for management of geo-sensor data and their integration with other 3D information
- Analysis DM&EM needs for 3D models (use and update of spatial information)

3D models in DM&EM

E-Semble, The Netherlands

Brisbane, 18January, 2011

National Geographics

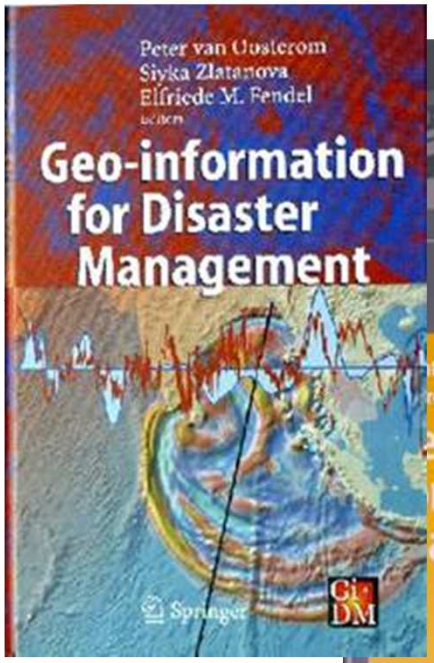
Industrial interfaces, Ireland

Gi4DM 2005 -2011 …
ISPRS WGIV/8, ISPRS WG VIII/1
JB GIS, UNOOSA, ICA, OGC, EC

- Geo-information is important (no-doubts)
- All kinds of data have been used in last 5 years
- Spatial Data Infrastructure: legal/policy, standardization, technological issues
- Many systems are developed
- 3D/4D Data representations
- Volunteer Geographic Information systems
- ….

Developments are visible in the books

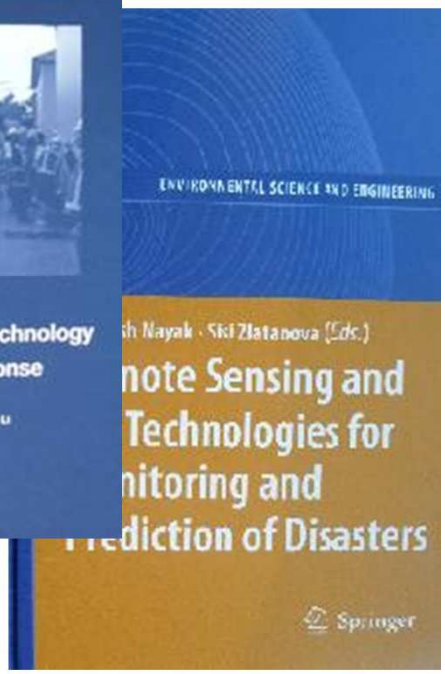
2005



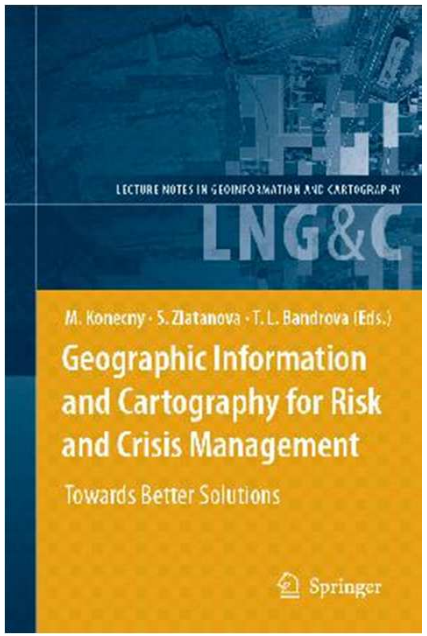
2007

2008

2008

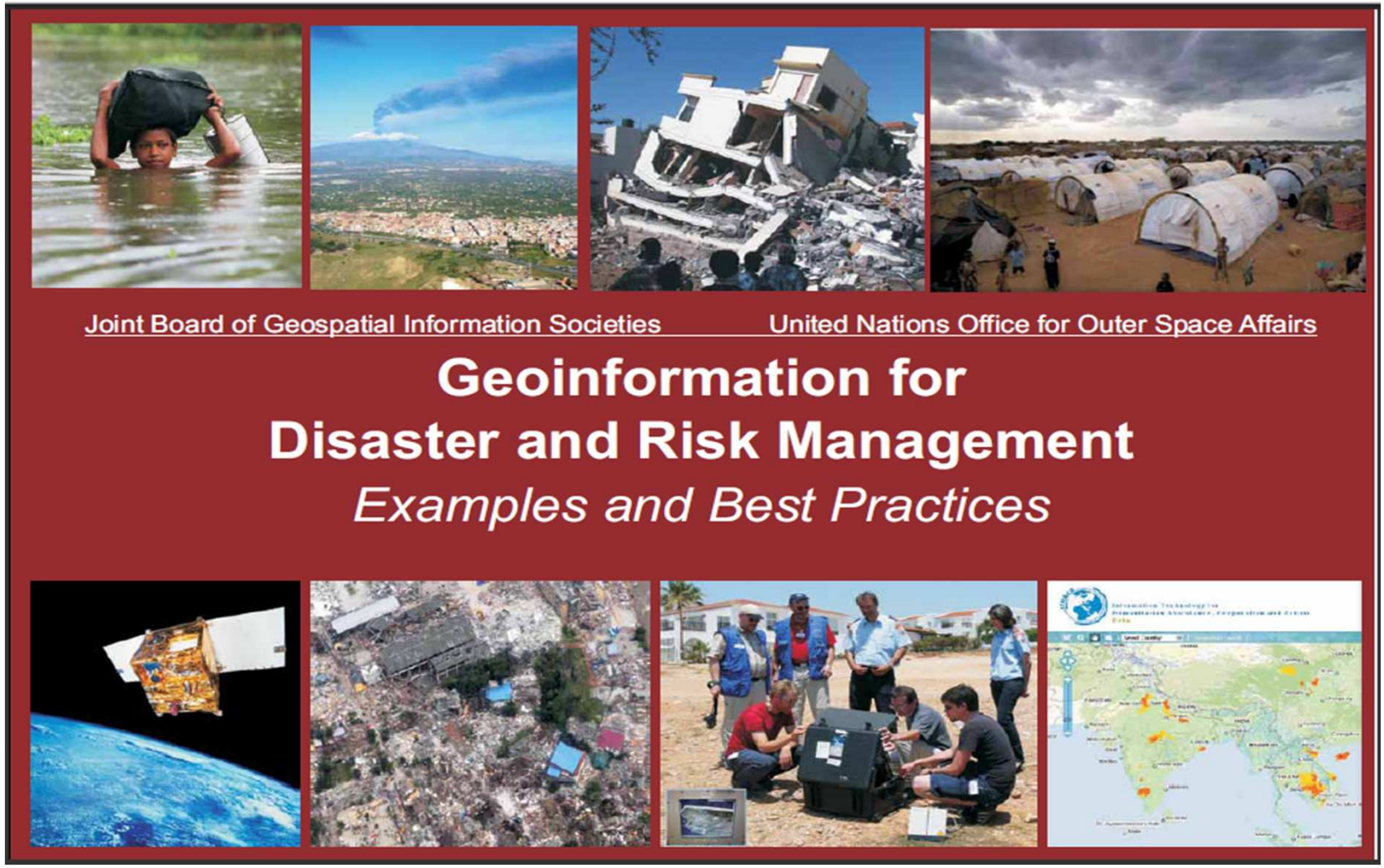


2010

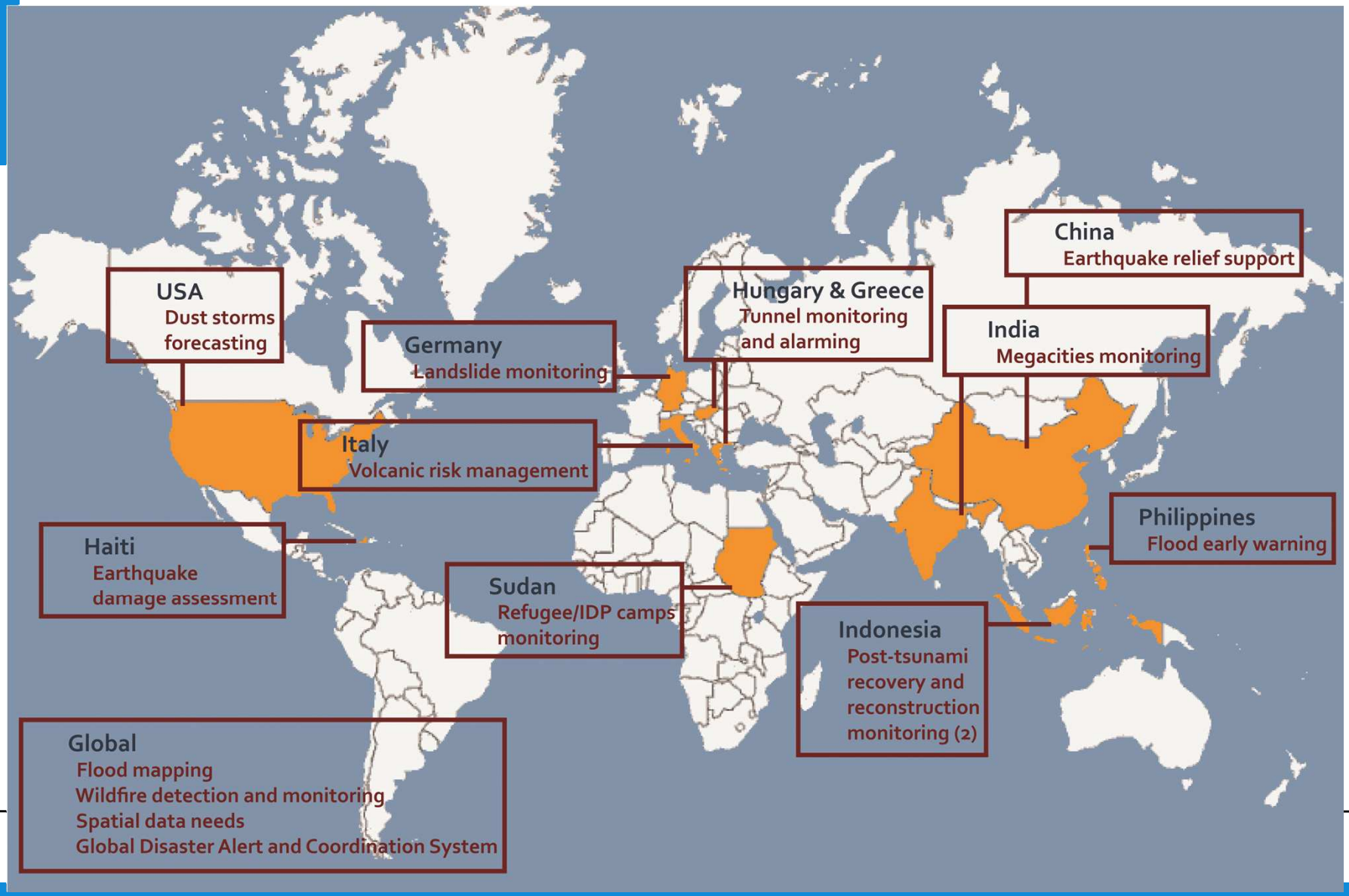


JB GIS and UNOOSA

Orhan Altan, Robert Backhaus, Piero Boccardo and Sisi Zlatanova



Geographical Distribution of Papers



VALID

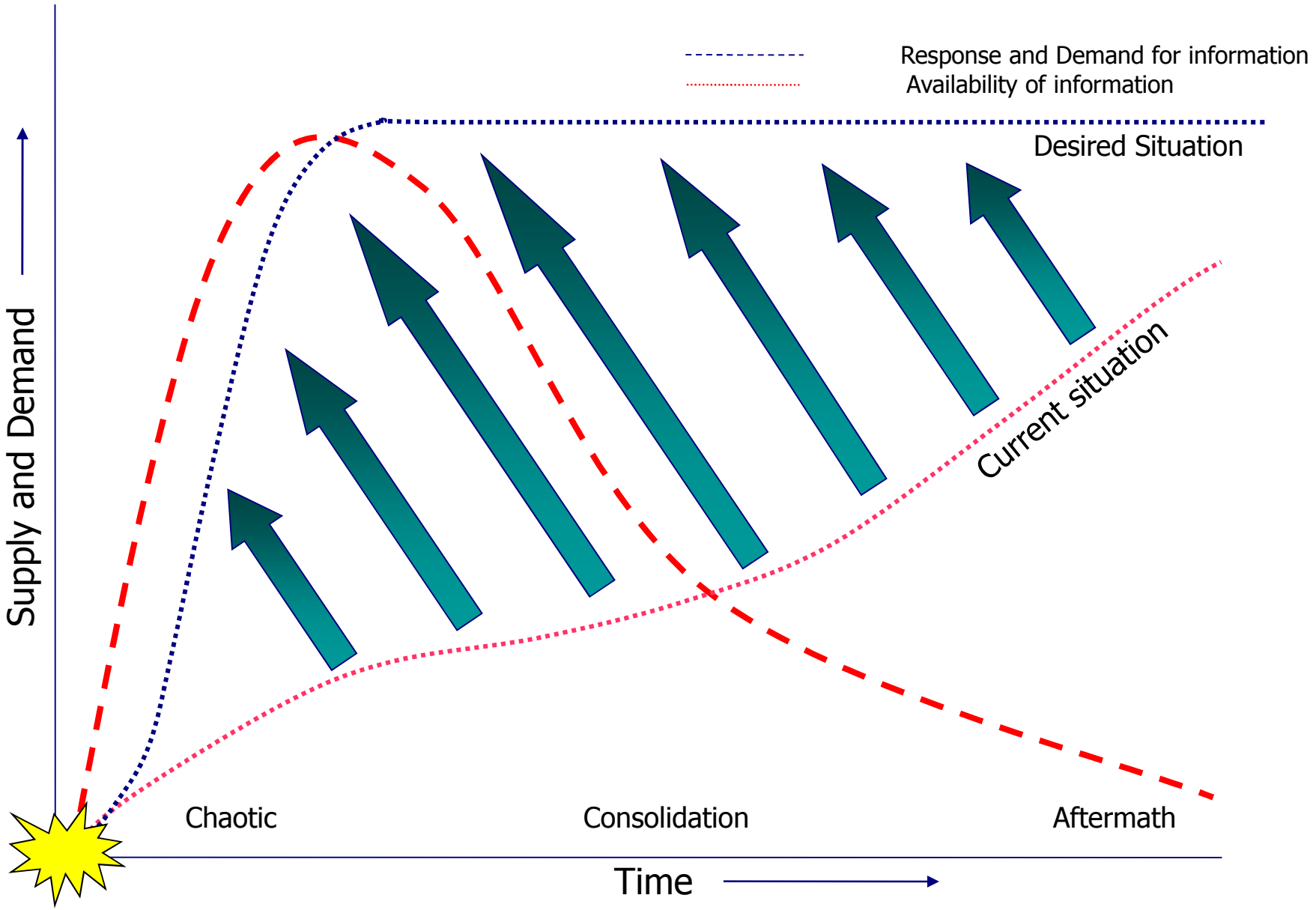
The Value of Geo-Information for Disaster and Risk Management (VALID)
- Benefit Analysis and Stakeholder Assessment -

A publication to that end would further help:

- to raise awareness in the political and programmatic environment and
- to set priorities in research and development.

Geo-Information is mostly applied where it is cheap and less efficient!

http://www.un-spider.org/VALID-stakeholder-assessment-I

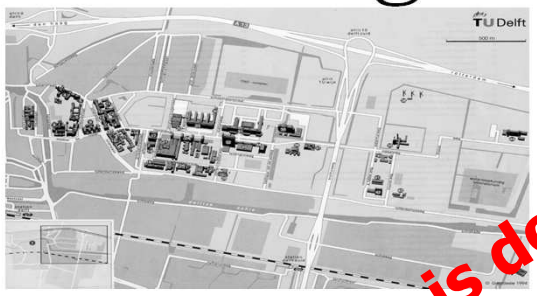

Response and Demand for information
Availability of information
Desired Situation
Current situation
Supply and Demand
Chaotic
Consolidation
Aftermath
Time

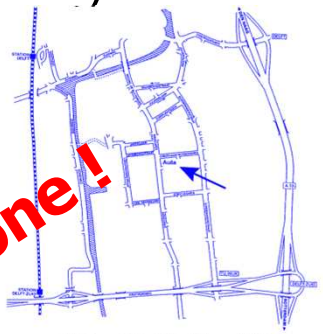
Information is not used efficiently!!

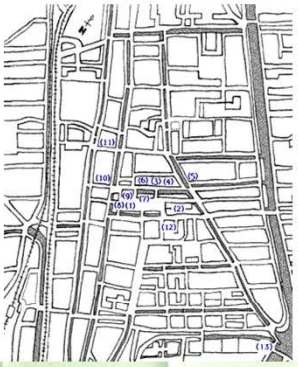
- Data integration is problematic
- Data filtering with respect to the context (task, procedure, occupancy..) is still wish

Data challenge: data heterogeneity

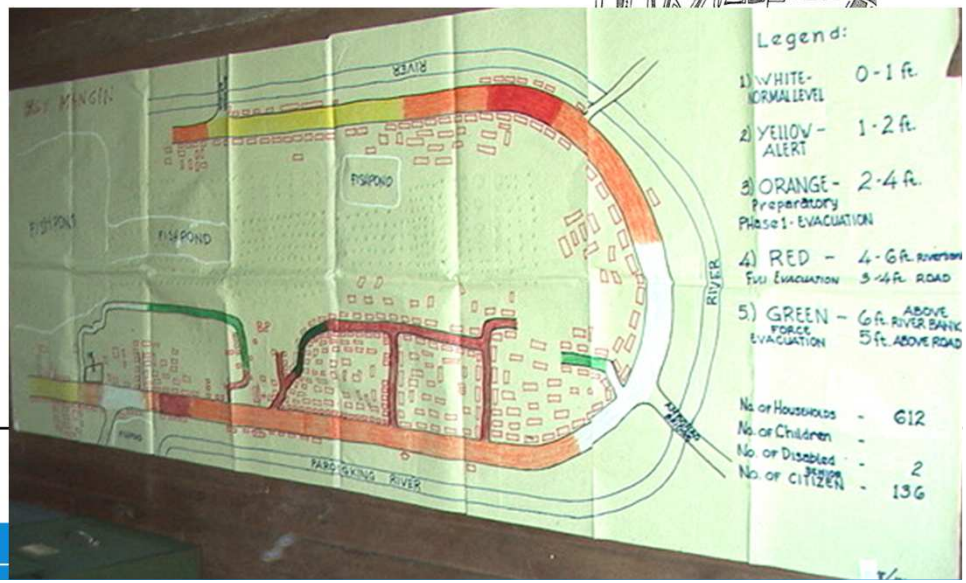
- Data exist in many applications
  - Dependent on the view of the user
  - Objects of interest
  - Scale
  - Resolution
  - Generalisation criteria
  - Theme
  - Time
  - Language
- Dynamic data
  - Row data (measurements, images)
  - Processed data
  - Unstructured
  - Owner







A lot of work is done !



Chaos in the first hour after a disaster

Pieter Breugel de Oude, 1556, Museum Boijmans van Beuningen, Rotterdam

- Much information could be confusing!!!!

- Subdivision of tasks
- Experience to work together

=> context-aware systems!

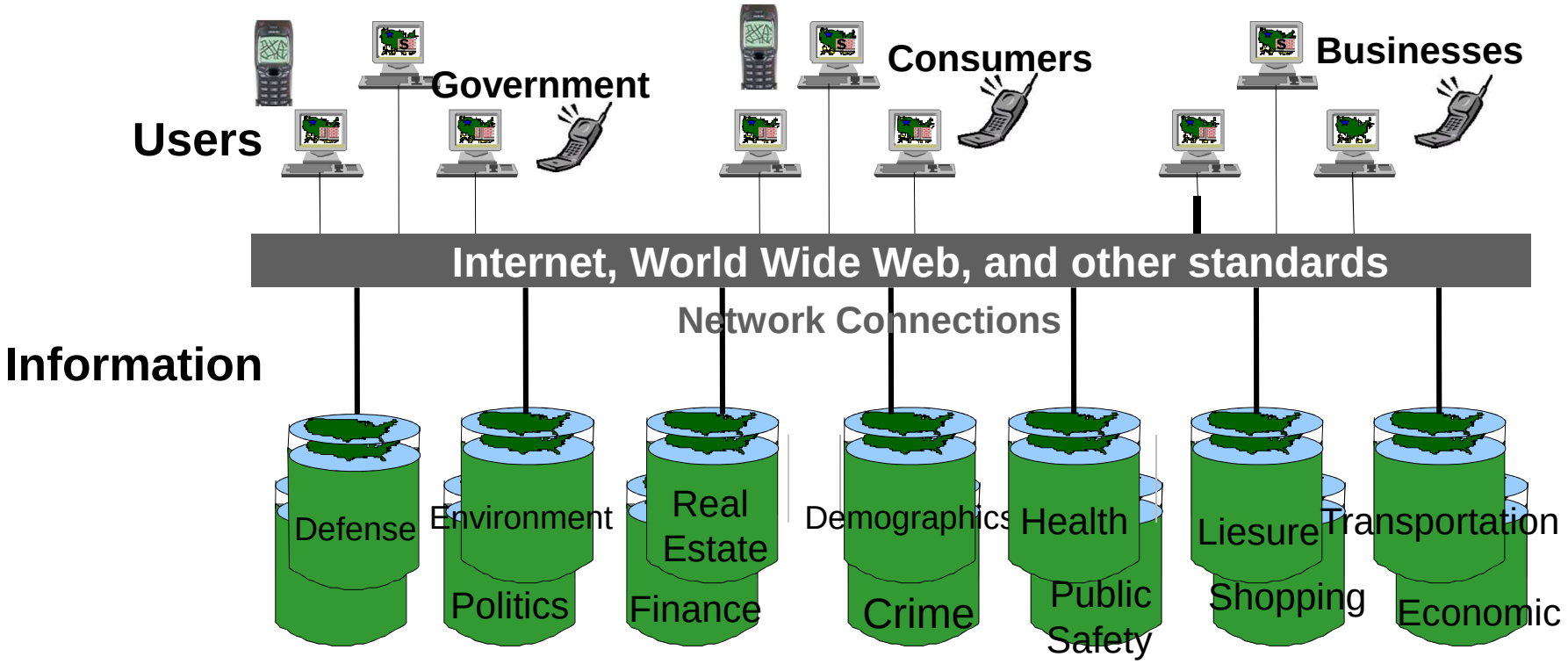
User-centered systems?

- Many different systems developed
  - Command and control
  - Early warning (for a specific disaster or groups of disasters)
  - Simulation and prediction
  - Task-oriented (e.g. Patient tracking)

…….none of them are user-oriented

OGC concept

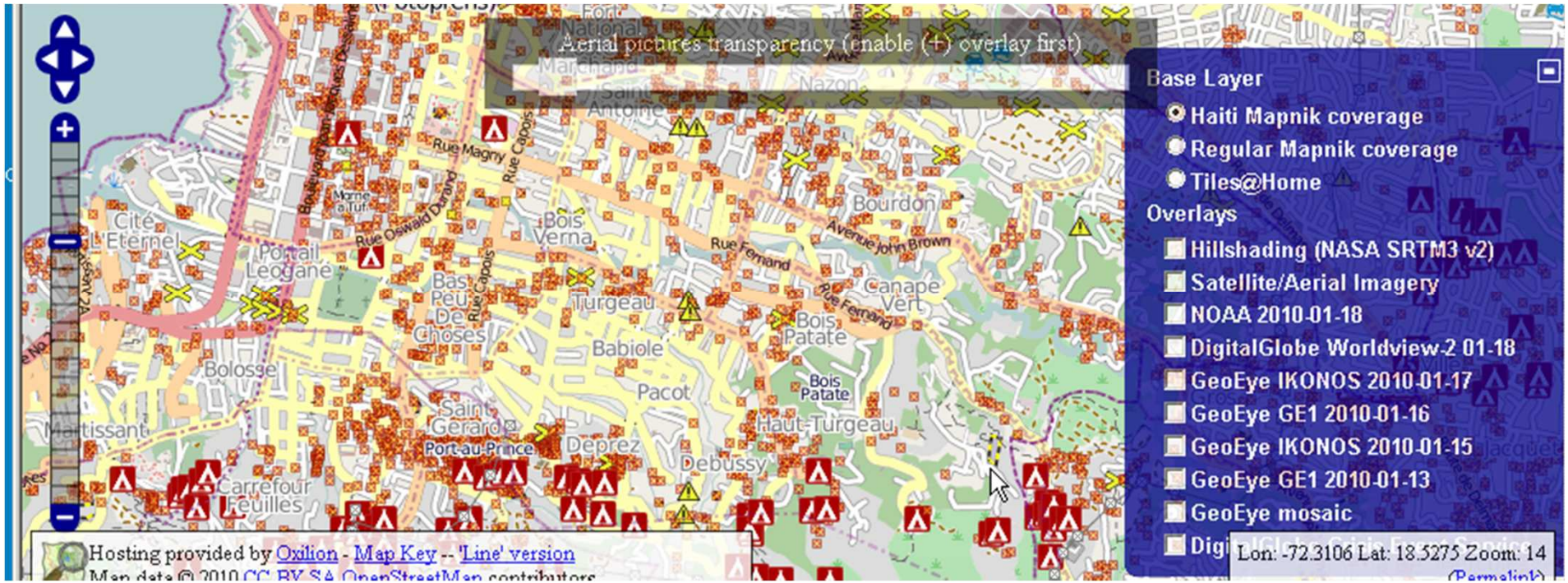
…infrastructures rely on a variety of technology "standards" and network connections.



Reed 2002

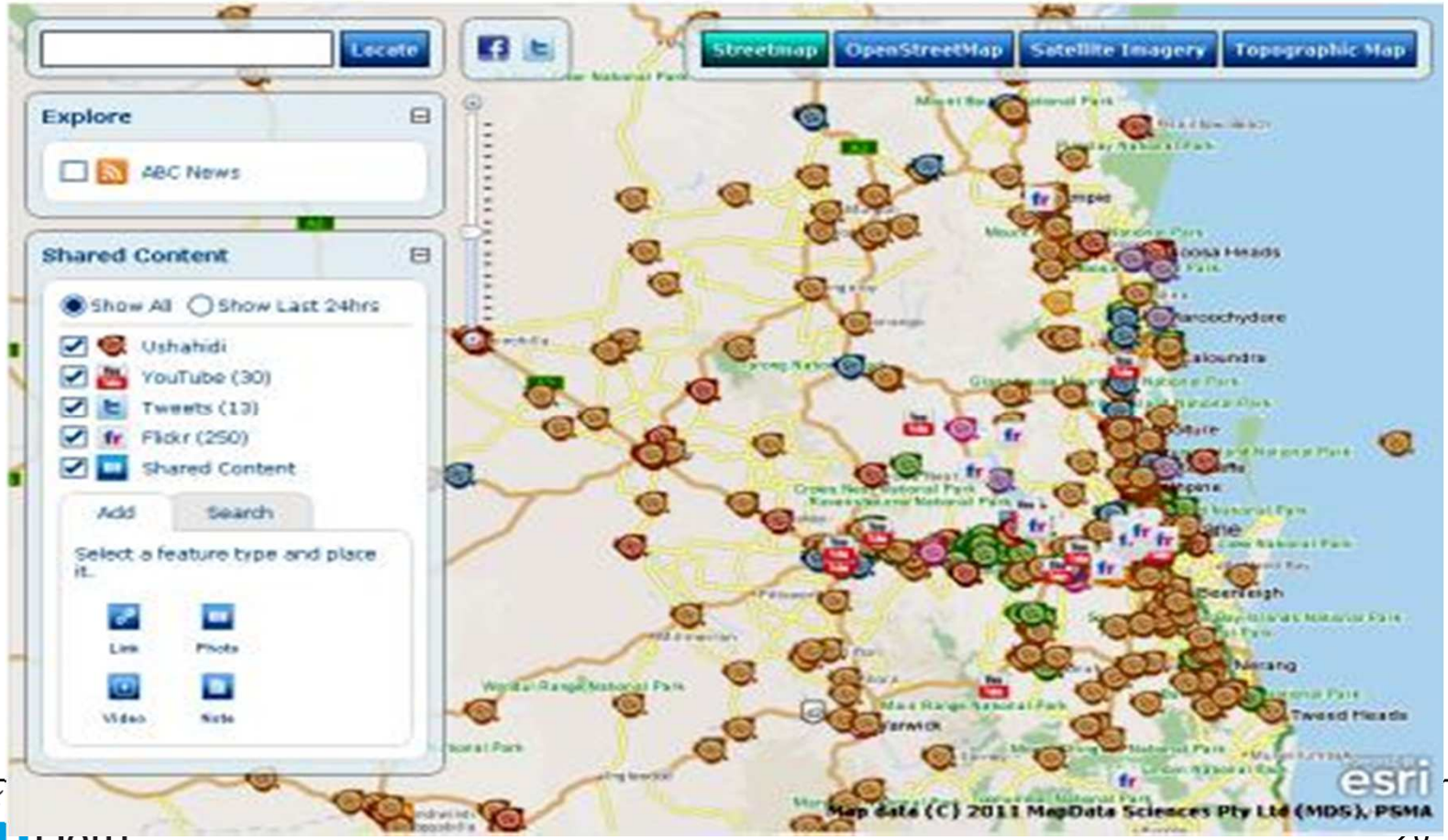
Community sites

Open Street Map http://haiti.openstreetmap.com

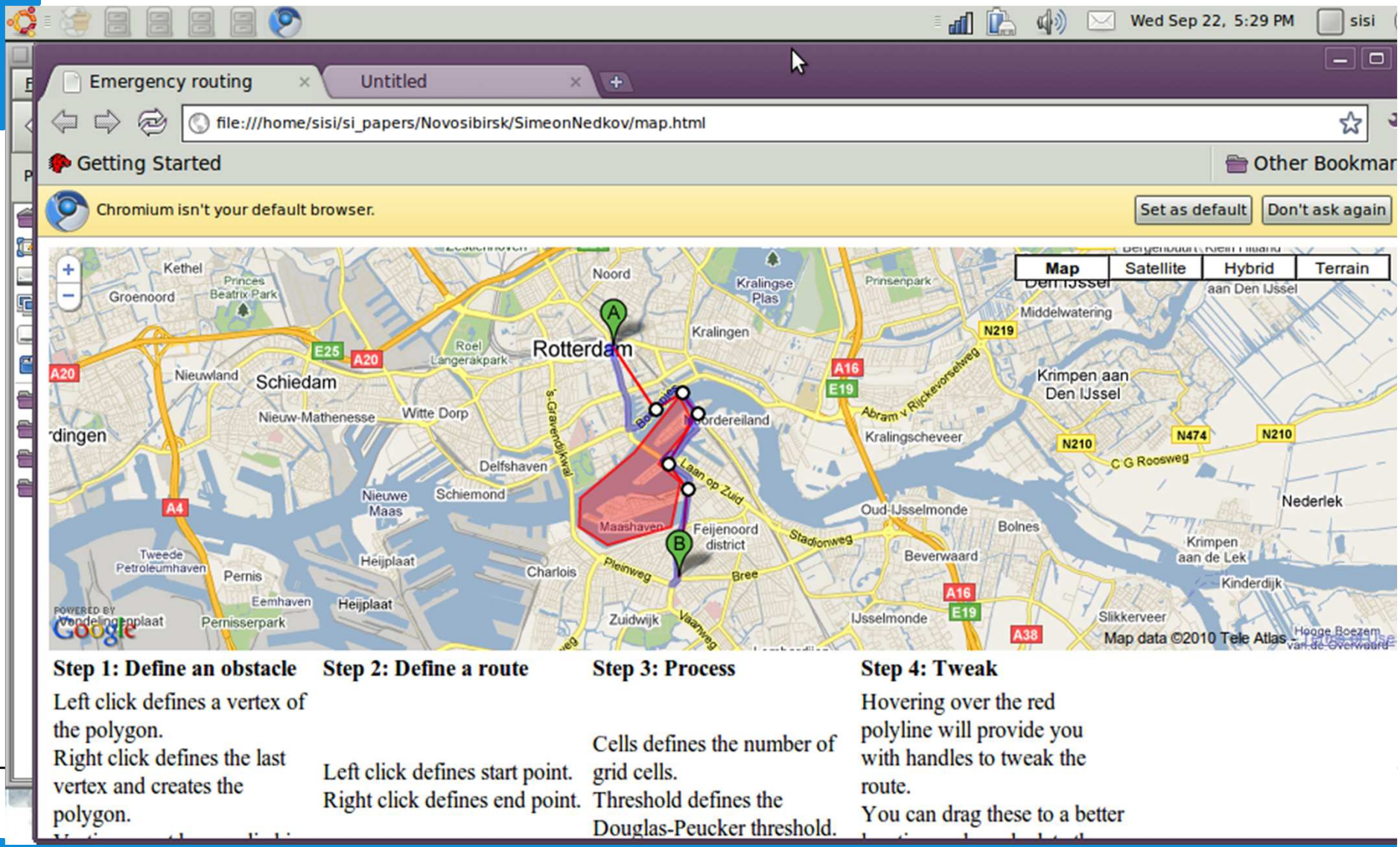


Community sites

Ushahidi & ESRI



Community sites



Step 1: Define an obstacle

Left click defines a vertex of the polygon.
Right click defines the last vertex and creates the polygon.

Step 2: Define a route

Left click defines start point.
Right click defines end point.

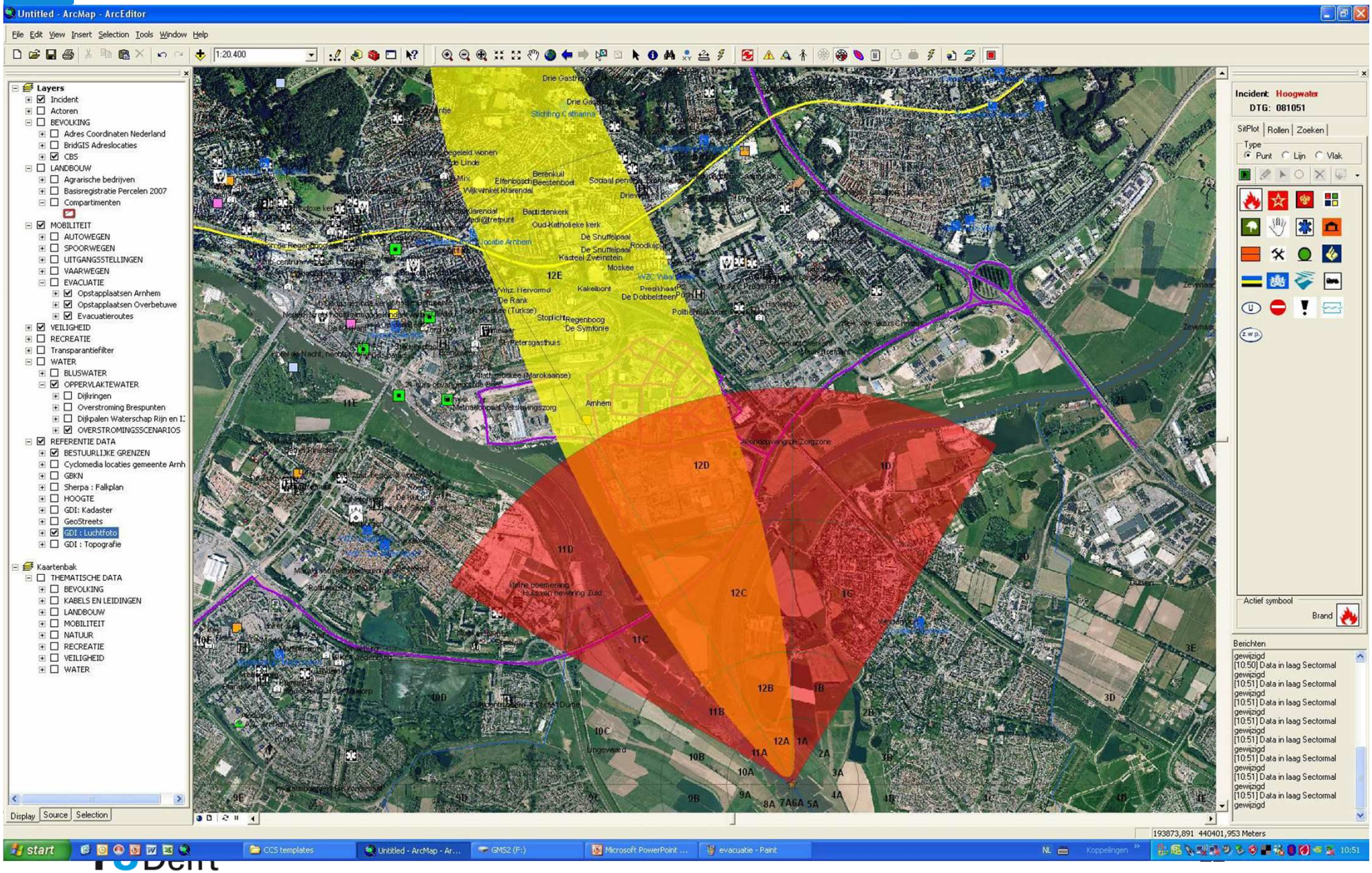
Step 3: Process

Cells defines the number of grid cells.
Threshold defines the Douglas-Peucker threshold.

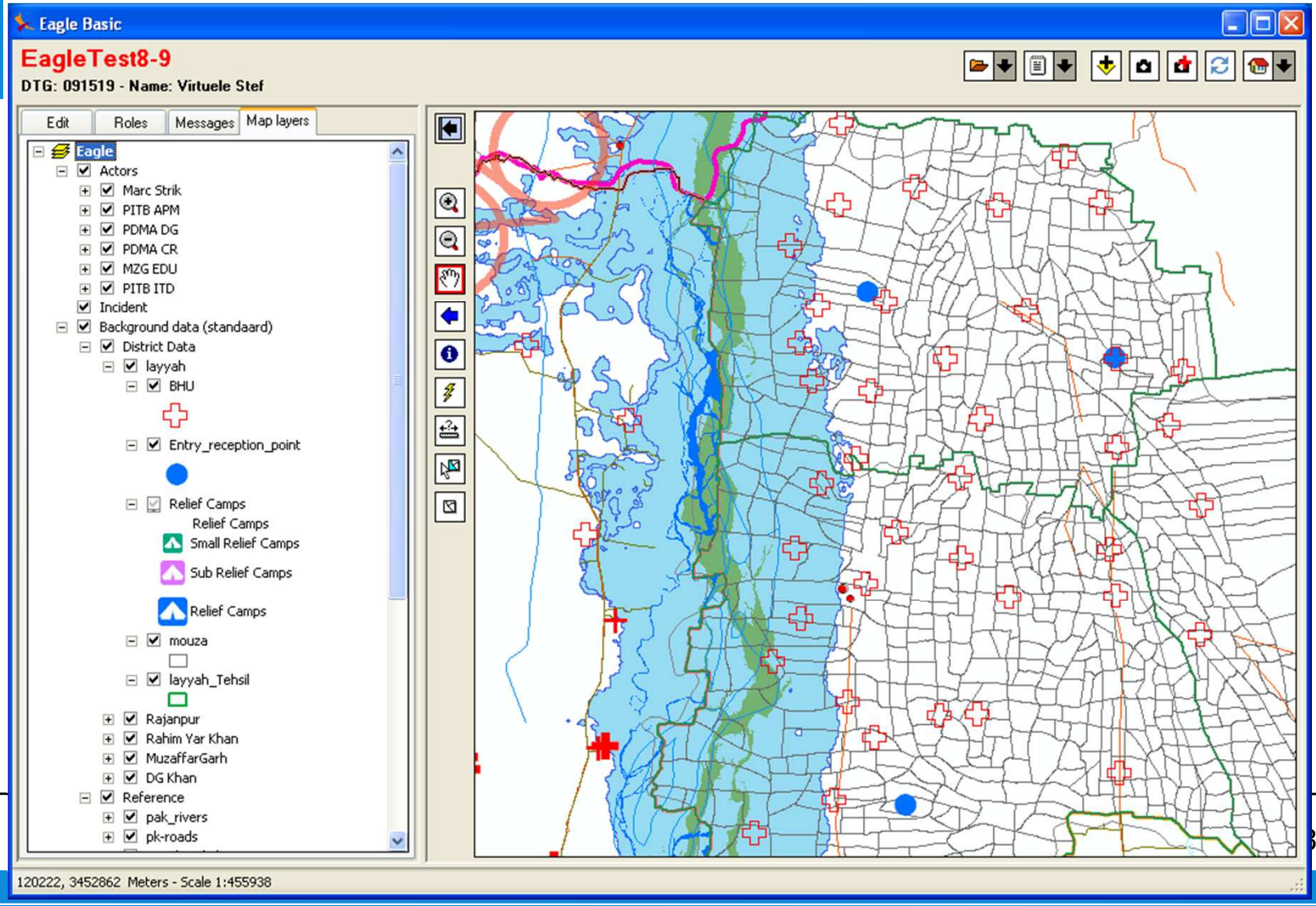
Step 4: Tweak

Hovering over the red polyline will provide you with handles to tweak the route.
You can drag these to a better

Netcentric: Eagle (Geodan, ESRI, Microsoft)



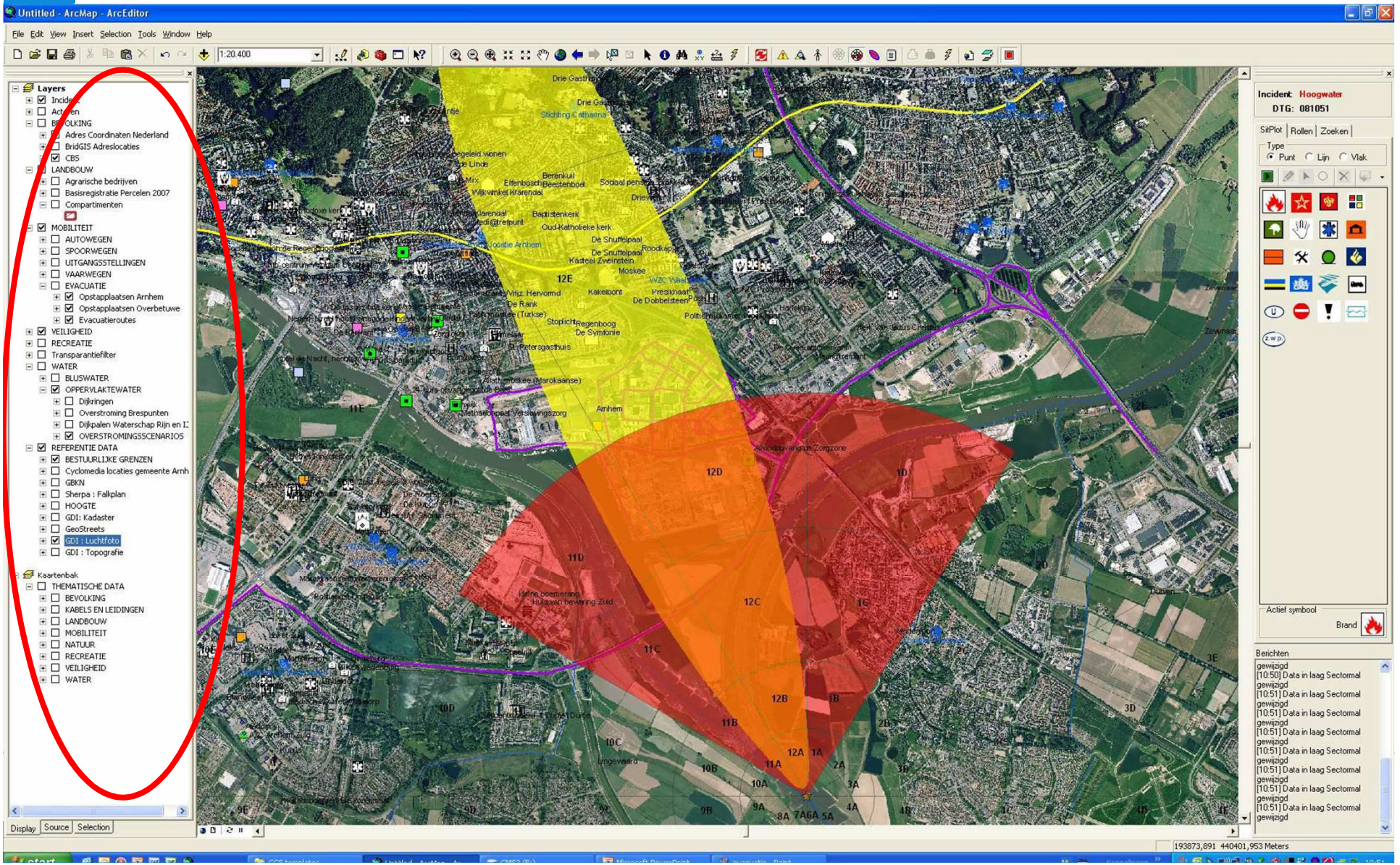
Eagle4Pakistan



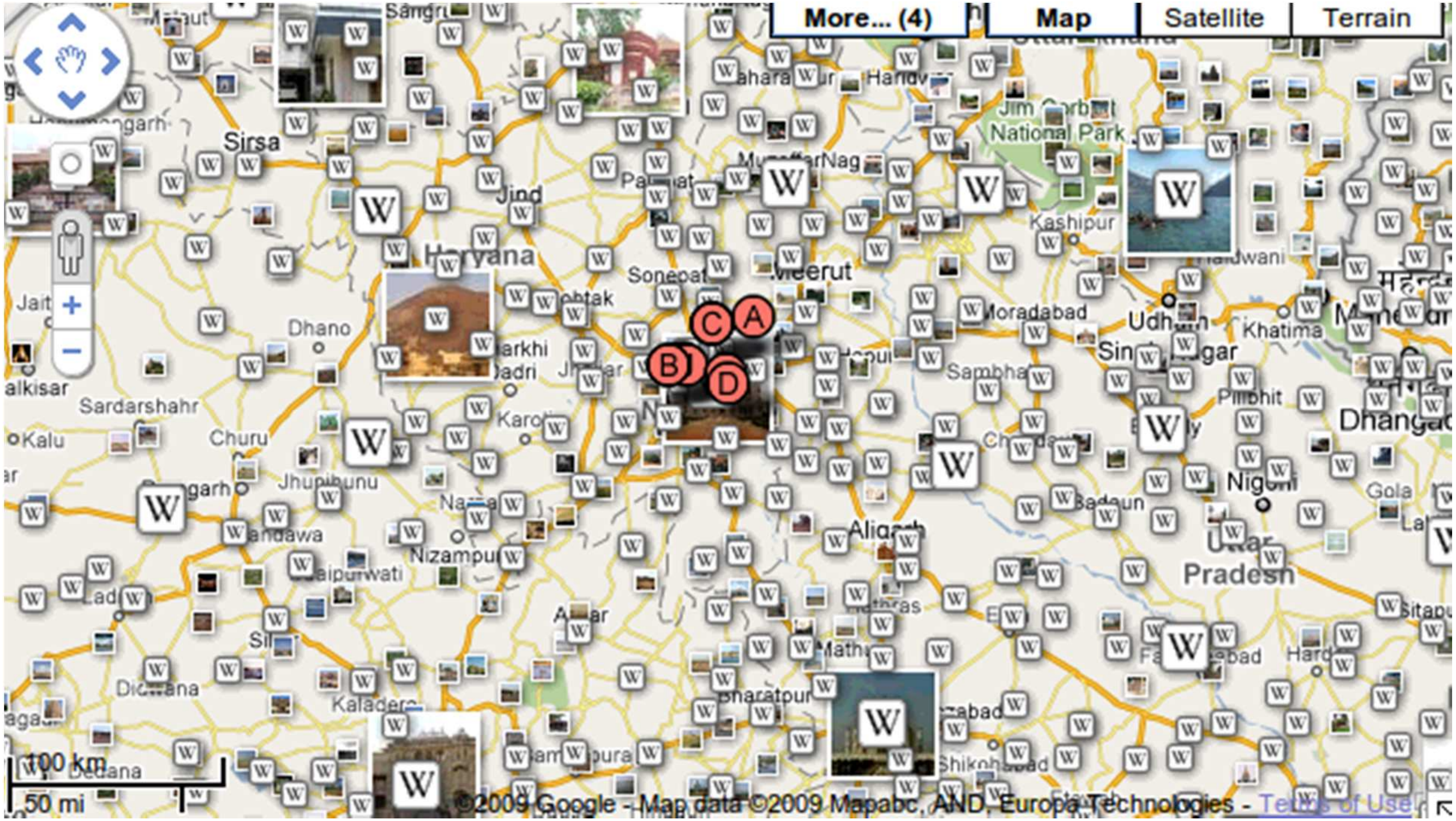
Eagle4Pakistan

- Team in Amsterdam
- Involve geo-network via social media
- Donation of Eagle software worth $ 500.000
- Team to Lahore
- Installation and training
- Geo-data collection

Eagle: a lot of information!



Google Maps


More... (4)
Map
Satellite
Terrain
Sirsa
Jind
Haryana
Meerut
Kashipur
Moradabad
Khatima
Pilibhit
Dhano
Sardarshahr
Churu
Jhunjhunu
Nizampur
Aligarh
Pradesh
100 km
50 mi
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Distribution of tasks

Law for Disasters and Large Accidents (WRZO, http://wetten.overheid.nl/, 30 januari 1985)

19 types of disasters (e.g. aircraft crash, flooding, etc.)

4 levels of emergency on North see (Categories I-IV)

7 levels of emergency in Schiphol (VOS 1-7)

5 levels of emergencies on land (GRIP1 to GRIP5)

25 processes (e.g. traffic control, disinfection of vehicles, measurements and observations)

4 primary responsible units (fire brigade, police, paramedics, municipality)

Processes describe tasks

Responsible: *Fire brigade (Regional chief officer)*	
1.	Fighting fire and emission of dangerous substances
2.	Rescuing and technical assistance
3.	Decontaminating people and animals
4.	Decontaminating vehicles and infrastructure
5.	Observations and measurements
6.	Alerting the population
7.	Making accessible and clearing u

Cluster B: Medical Assistance Responsible: *GHOR (Regional Medical Off*	
8.	Medical aid chain
9.	Preventative public health and m
10.	Psycho-social aid and care

Cluster C: Public order and Traffic Responsible: *Police (Corps chief) and/or*	
11.	Clearance and evacuation
12.	Fencing off disaster area
13.	Traffic control
14.	Maintaining the legal order
15.	Identification of fatal casualties
16.	Giving directions
17.	Criminal investigation

Cluster D: People care Responsible: *Municipality (Mayor)*	
18.	Advice and information
19.	Relief and care
20.	Funeral arrangements
21.	Registration of victims
22.	Providing primary needs
23.	Damage registration
24.	Environment protection
25.	Follow-up care

General supporting processes Responsibility: all sectors	
	Alerting
	Care/logistics of disaster recover
	Connection/communication
	Registration and reporting/archiv
	Evaluation

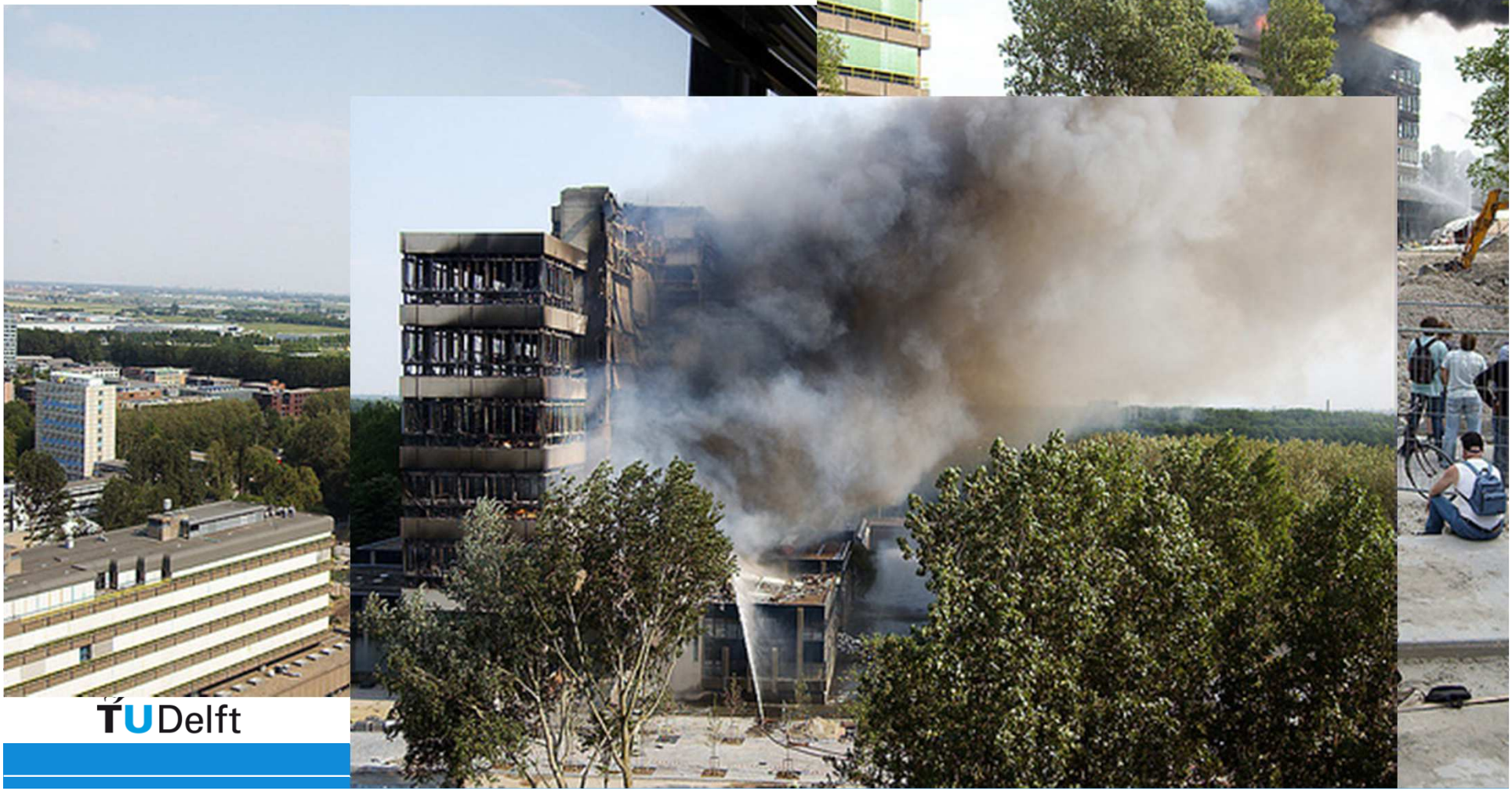
Explosion fire works storage,

13 May 2000, Enschede

Fire in TUDelft

13th may, 2008, Delft

Faculty of Architecture



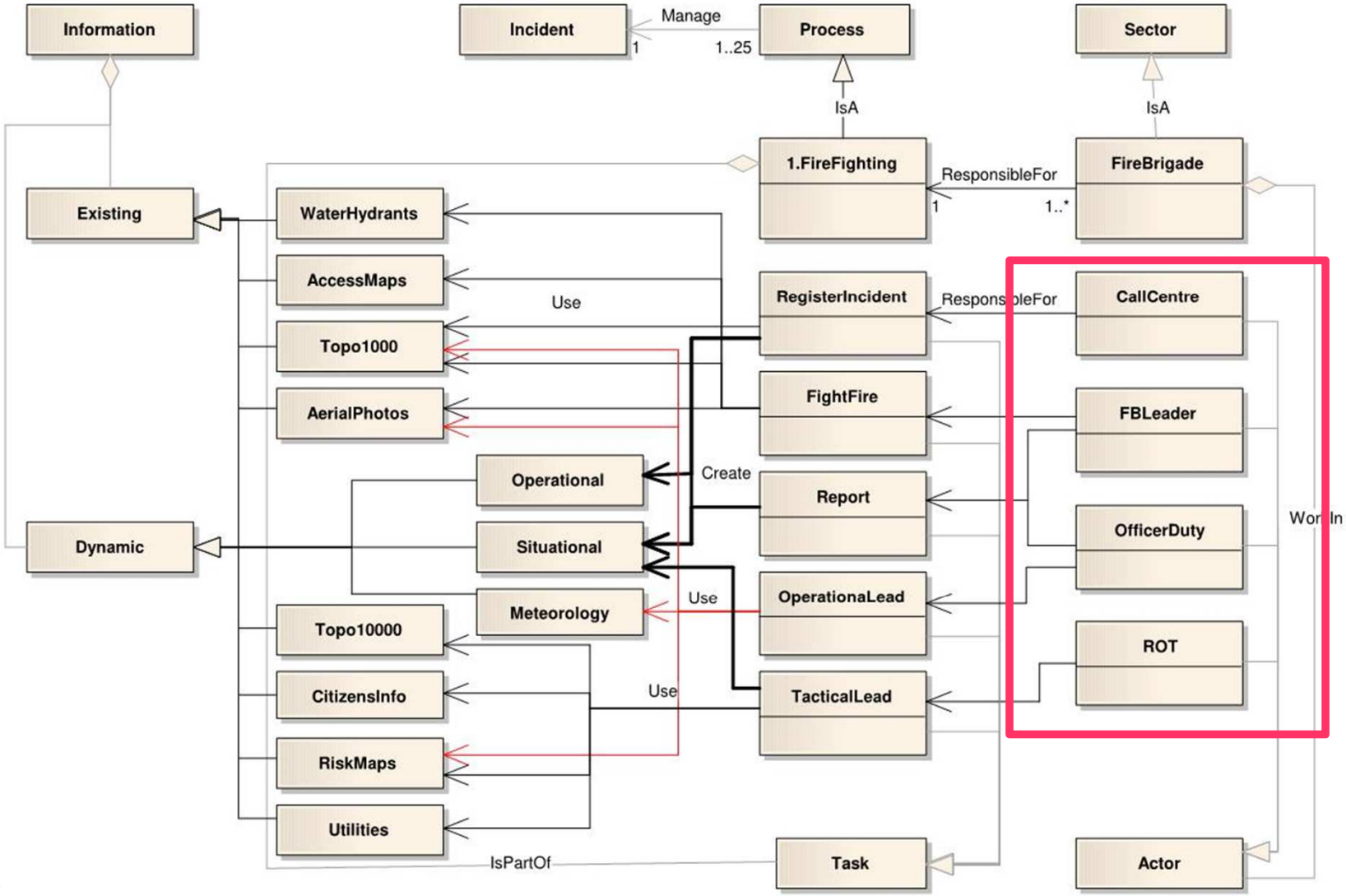
TU Delft

Approach

- Formally model all the tasks
- Define which tasks need what data
- Define which tasks produce data
- Define which objects are of importance
- Allow search of objects

a fireman on the field wants 'buildings' and the systems gives him the highest resolution (scale) buildings for his area (and only the buildings)

Process 1: fire fighting



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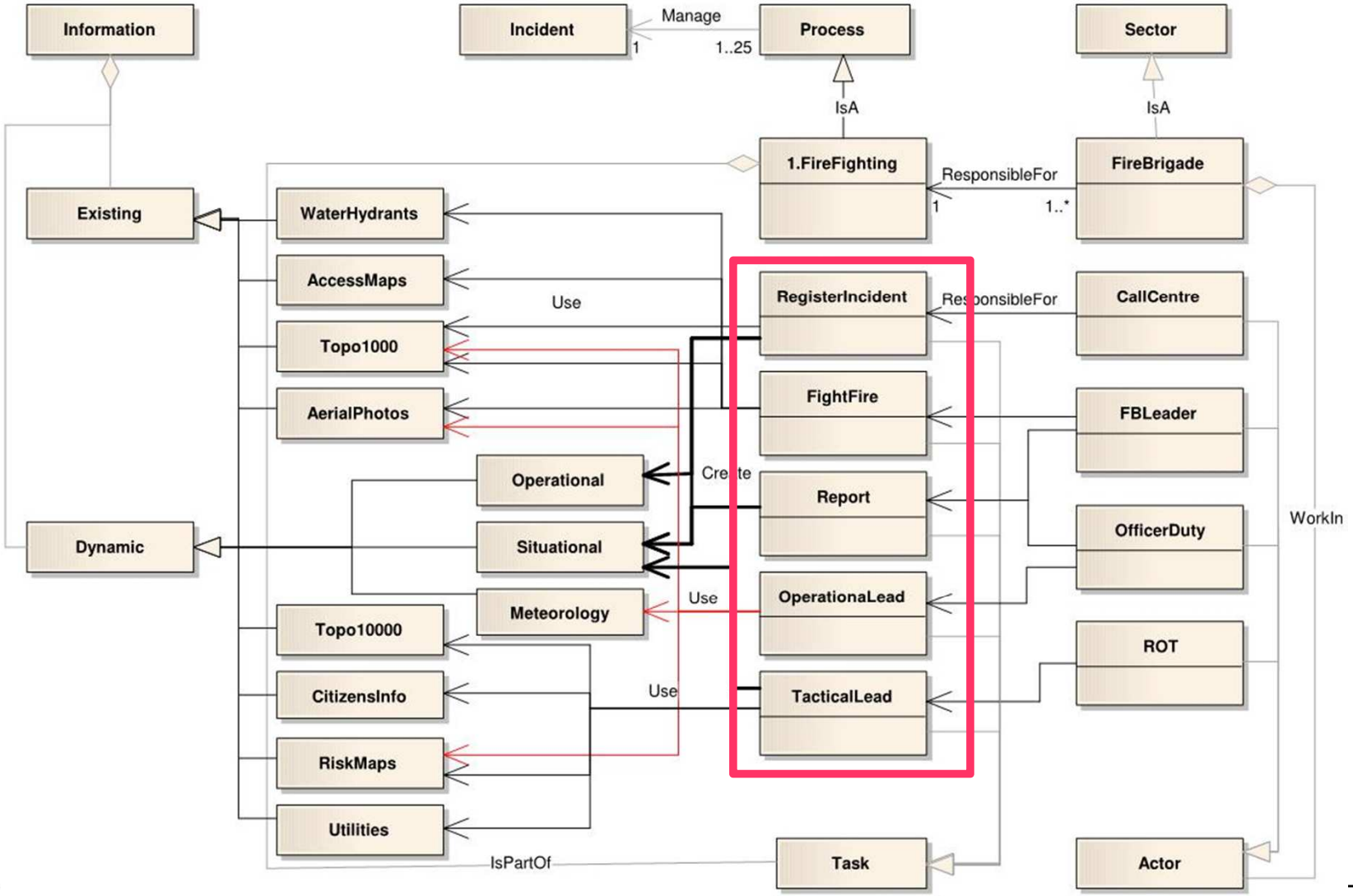

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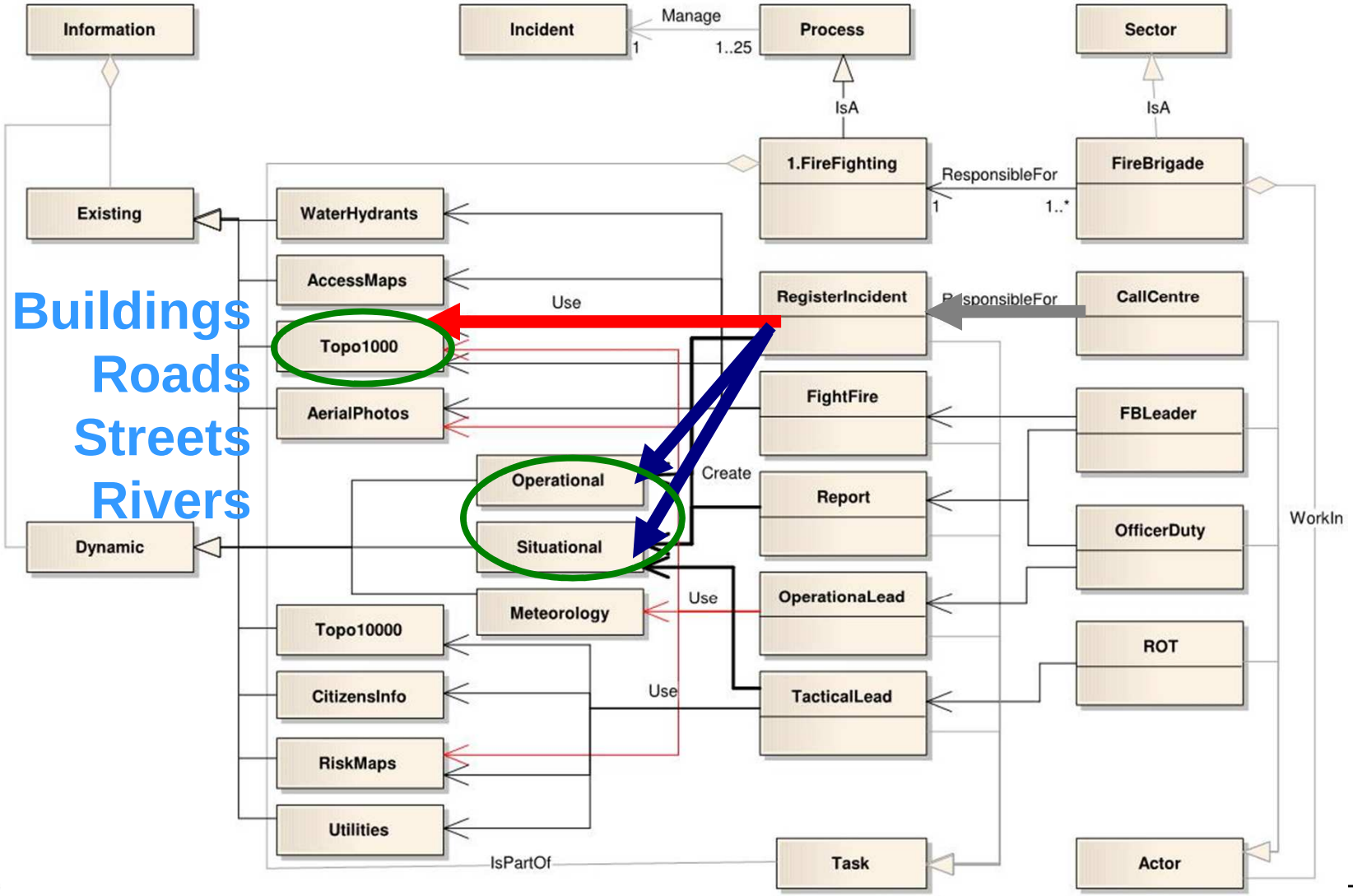
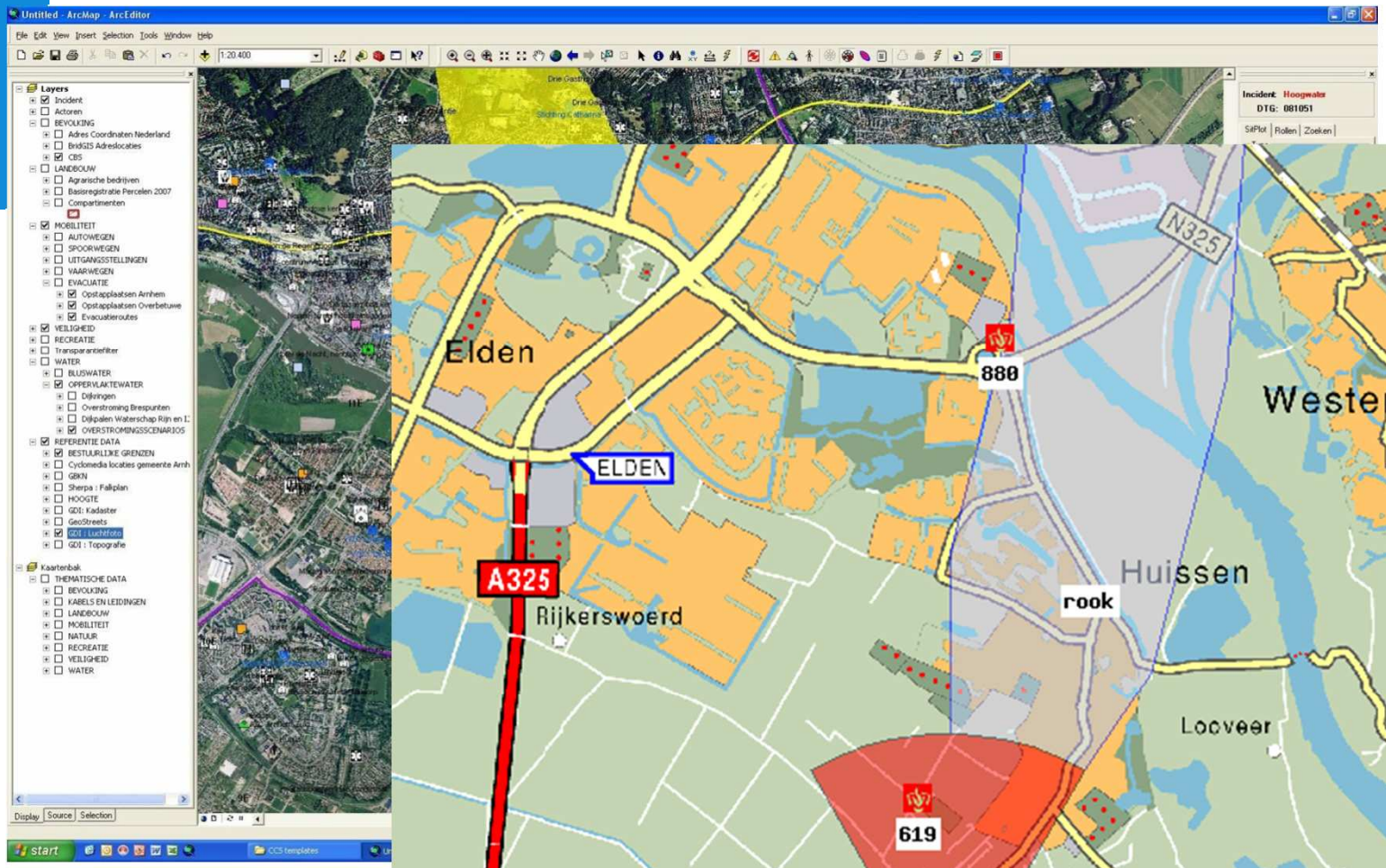


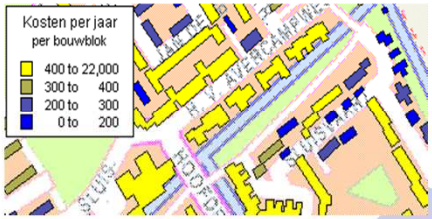
Different views (field,CC)

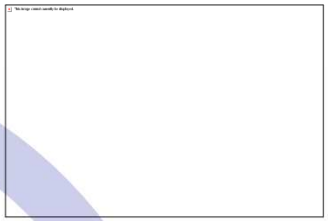


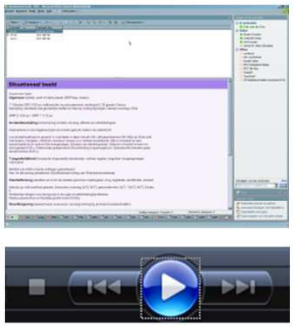
Field view

Operational view

Part of Disaster management cycle







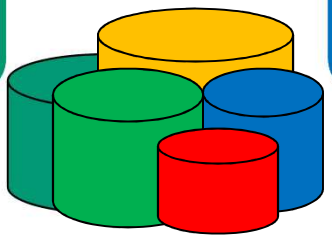
Mitigation

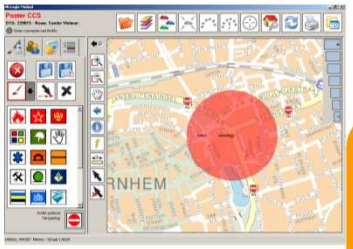
Preparation

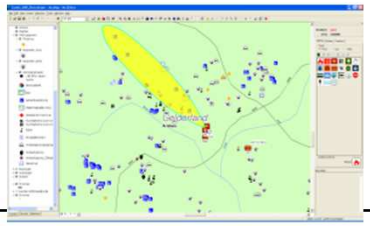
Response

Recovery

Evaluation







Concluding words

- Data integration
  - Data Models (huge data sets, large amounts of sensor information)
  - Standards for exchange of data
- Context-aware systems
  - Investigate/establish processes and procedures
  - Semanic web

=> increase the trust in the system => training!
=> decision support systems

Thank you
for your attention

http://www.commission4.isprs.org/
http://www.gdmc.nl/zlatanova