Value Chain Mapping

Resilience Use Case

The Added Value of 3D Geo-information

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Agenda

- Purpose: why look at resilience?

- Approach: what we did.

  - Workshop

- Results: what we achieved

  - Value chain

  - Qualitative Benefits

  - Reference material

    - London Olympics

    - USGS Study: Homeland Security and Law Enforcement

- How can the deliverables be used

Purpose: why look at resilience?

- The term has come to prominence recently to describe **the ability of a nation or city to respond to civil emergencies**.
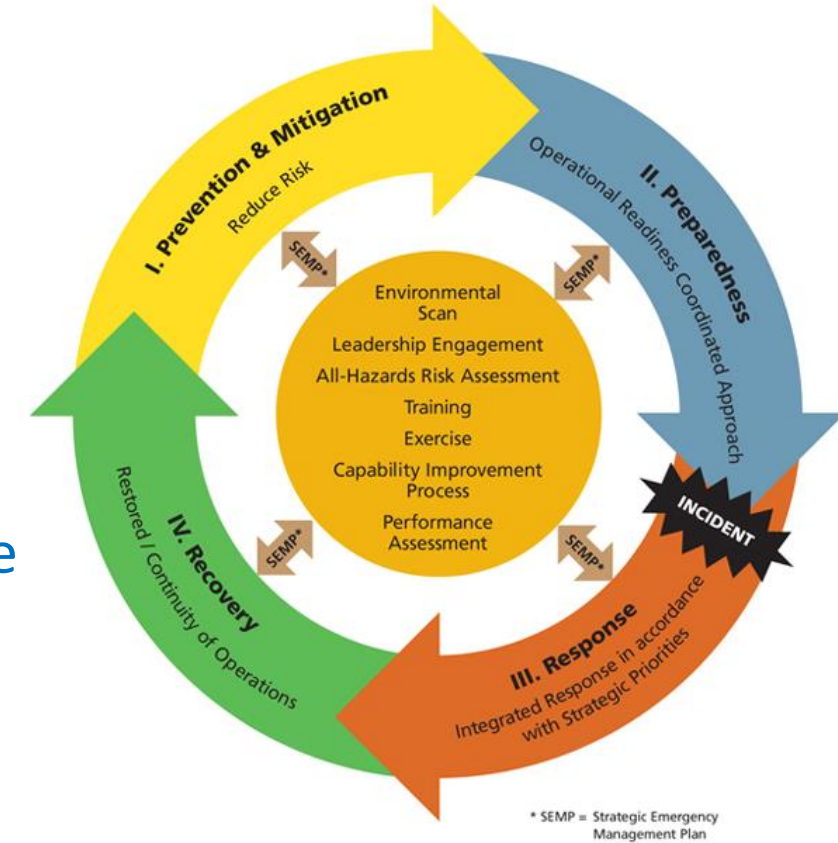
Purpose: why look at resilience?

- The term has come to prominence recently to describe **the ability of a nation or city to respond to civil emergencies**.

- The timing of the workshop was apposite - it occurred just after the attack on Brussels airport so emphasises the scope covers not only **natural events** but also **man-made**, particularly **terrorist incidents**.

- It was also very relevant in Belgium because of the **fragmented responsibilities** between federal, regional and local government bodies, making **coordination a key requirement**.

- Although the **requirement for 3D geo-information** is intuitively obvious, the economic case is often **not well understood** or articulated.

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Approach: what we did.

- Workshop in Brussels

  IGN Belgium / 13th July 2016.

- Overall aim :

  - Document the resilience process across the emergency management cycle: mitigation, preparedness, response, and recovery using **value chain mapping** to represent the results.

  - Identify the key actors, data, services and users

  - Identify where the most significant **socio-economic benefits** would be added by access to **3D geo-information**.

I. Prevention & Mitigation — Reduce Risk

II. Preparedness — Operational Readiness Coordinated Approach

III. Response — Integrated Response in accordance with Strategic Priorities

IV. Recovery — Restored / Continuity of Operations

Environmental Scan
Leadership Engagement
All-Hazards Risk Assessment
Training
Exercise
Capability Improvement Process
Performance Assessment

INCIDENT

* SEMP = Strategic Emergency Management Plan

Source: Public Safety Canada

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Approach: what we did.

- Workshop in Brussels

The event was attended by experts in resilience from the private and public sectors in Belgium.

Representatives from:

- Raw data, information products and services **providers**
  - Stijn Claes (EuroSense)
  - Eric Bayers (IGN)
  - Philippe Serruys (SIGGIS)
- **Aggregators**
  - Frédérique Lagae (Astrid)
- **End users**
  - Christophe Cloquet (My-Poppy)

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Approach: what we did.

- Workshop in Brussels

Example: presentation of **ASTRID** (Frédérique Lagae) – **Service aggregator -** Emergency management operator

- Emergency calls (Belgium 100, 101, and 112)

- 15 dispatching centers and local police

- Call taking and dispatching

- Assists the teams on the grounds

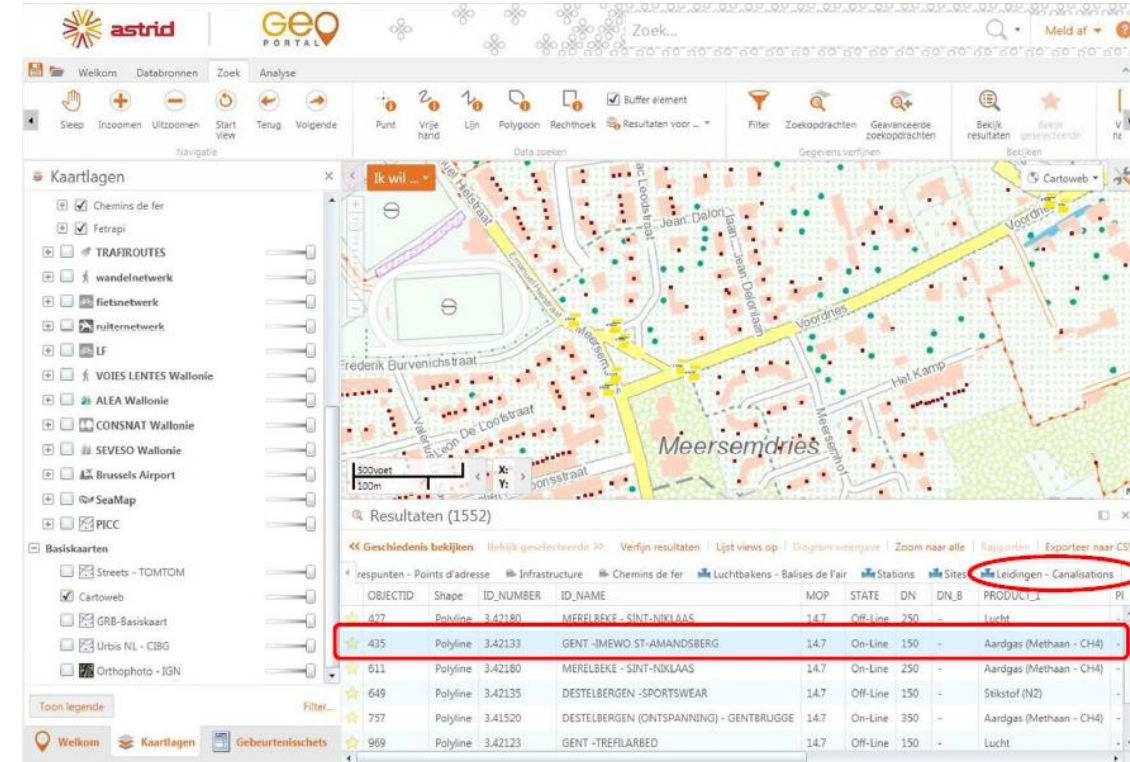- Integrated, computer-aided, Intergraph technology

- 3000 calls per day

Approach: what we did.

- Workshop in Brussels

Example: presentation of **ASTRID** (Frédérique Lagae) – **Service aggregator -** Emergency management operator

- Geographic data needed for :

  - Localization

  - Routing (recommendation fastest team on site)

  - Environmental Information

- Wide range of different (2D) data sets:

  - Data sets from government agencies:

    AGIV, NGI, SPW, CIRB, register …

  - Commercial datasets TomTom, Lord, …

  - Free datasets: Google Maps, Bing Maps, OpenStreetMap …

Approach: what we did.

- Workshop in Brussels

Example: presentation of **ASTRID** (Frédérique Lagae) – **Service aggregator -** Emergency management operator

+ oblique imagery and street view

to estimate the situation on the ground
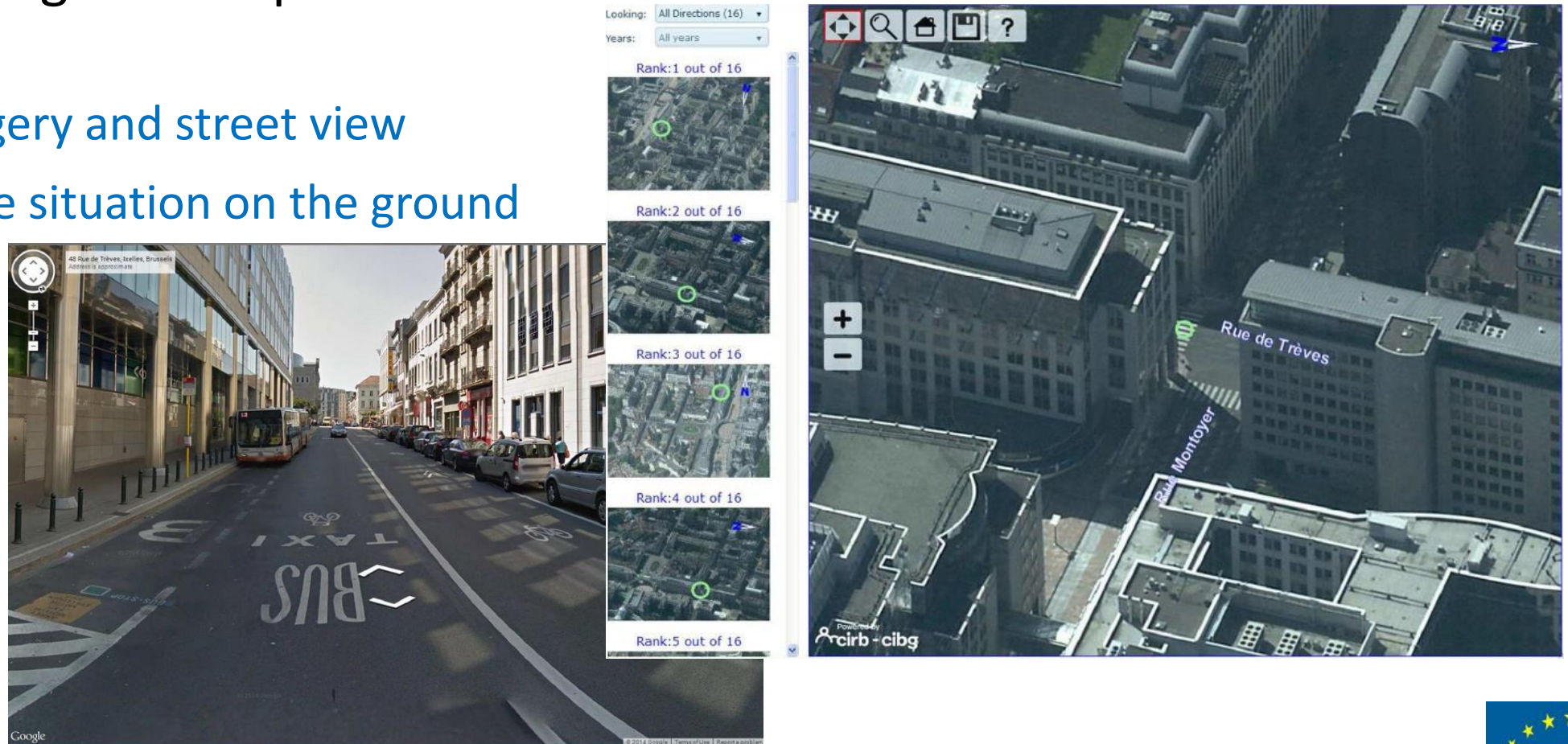
Approach: what we did.

- Workshop in Brussels

What we learned

- The Belgium system has **multiple authorities** with responsibility for resilience as well as a national and regional mapping agencies.

- Many geodatasets are used BUT

    - essentially **2D** data (addresses, maps, DTM, topographic data, lbs, …) + oblique imagery + street view

    - **no common model** -> lack of consistency in data

    - **3D data** (Citygml lod2 buildings) are being produced (at the regional level) but are **not** yet **integrated** into the system

- Improved coordination between the authorities by common access to more accurate 3D data is clearly added value -> **Interesting challenge, opportunity** to bring consistency back into the system (common 3D model to be defined).

- The defence and intelligence aspects of resilience are referred to but are not elaborated for obvious reasons of security and confidentiality.

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Results: what we achieved

- Value chain

- Qualitative Benefits

- Reference material

    - London Olympics

    - USGS Study: Homeland Security and Law Enforcement

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Results: what we achieved
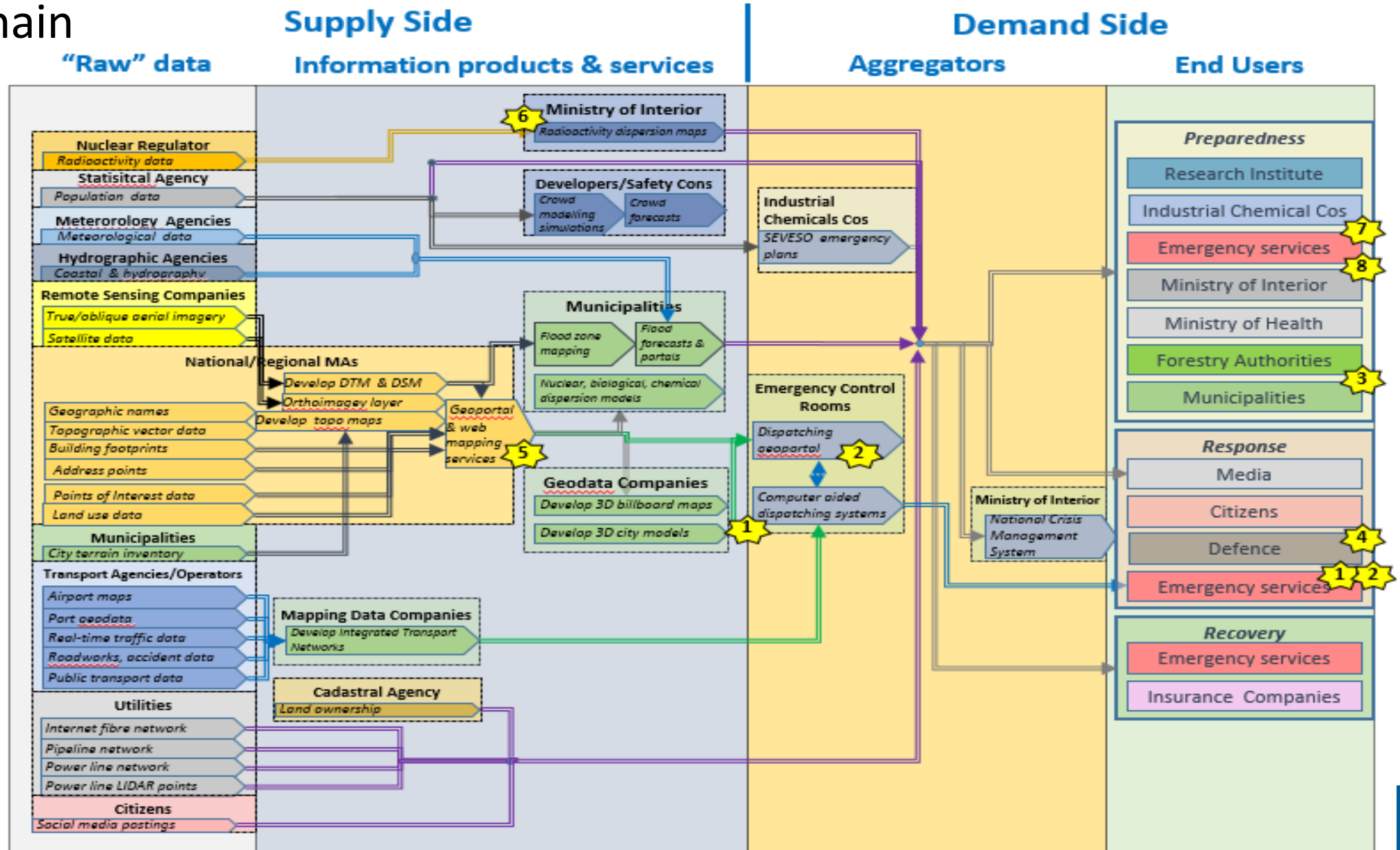
- Value chain

Results: what we achieved

- Value chain - Key Learning Points

Supply-side

- At least 16 actors (public/private, national/regional/local) are required to produce the raw data, information products ands services (30 datasets and services)

- For resilience, the key products are:

  - 3D building model + attribute data (addressing, POI, toponyms, floors, …)

  - 3D detailed "maps" (DTM, DSM, 3D topographic data) for all areas (not just for city center)

  - 3D transport network data (for all modes of transport)

Results: what we achieved

- Value chain - Key Learning Points

Demand-side

- Small numbers of specialist software developers and aggregators

- Key users

  - Emergency services (for dispatching emergency responders)

    - Require data for localisation of callers or incidents

  - Ministry of The Interior (for crisis management)

    - Require a greater number of datasets to coordinate potentially massive responses

  - Defence and intelligence services

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Results: what we achieved

- Qualitative Benefits (added value of 3D Geo-information)

Identified by the workshop participants as:

1. Better building information (layout, number of floors etc.) which reduces emergency service response times by improving access decisions: the right resource in the right place at the right time.

2. 3D city models improve the analysis of planned developments and allow factors such as crowd evacuation to be taken into account and the design evaluated to minimise the impact of incidents.
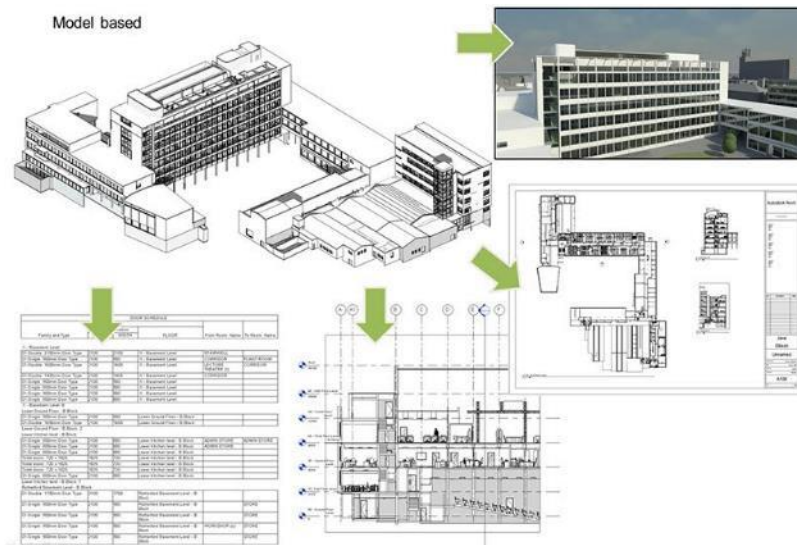
Model based

Results: what we achieved

- ## Qualitative Benefits

Identified by the workshop participants as:

3. Better and more accessible 3D information can be used by police/defence forces to respond to terrorist incidents more effectively, for example, by identifying and blocking escape routes or identifying sniper positions.

RTBF

⏱ Publié le mardi 15 mars 2016 - Mis à jour le mardi 15 mars 2016 à 21h26

204 ⤴

Plusieurs fusillades et une intervention policière ont eu lieu suite à une perquisition policière à Forest ce mardi après-midi, un peu après 15h. Un nombre indéterminé d'auteurs a pris la fuite, via les toits.

Several shootings and a police intervention took place following a police search in Forest this Tuesday afternoon, a little after 3pm. An unknown number of authors fled, via the roofs.

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Results: what we achieved

- Qualitative Benefits

Identified by the workshop participants as:

4. Improved data sharing and rationalisation reduces the cost of acquisition and improves interoperability

5. 3D contextual data (slope, terrain model, 3D topographic data, POI, ...) which improves localisation of callers and incidents by Emergency Control Room operators (particularly in rural areas where there are few landmarks and cell phone location accuracy is poor).

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Results: what we achieved

- Reference material: **London Olympics**

  - 20 million spectator journeys. More than 2.4 million people visited the Olympic Park, and more than four million viewed the games at live sites – all without adverse incident.

  - A single common operating picture of London 2012, avoiding conflicting information.

  - The collaborative approach with all involved agencies and sharing 400 different datasets (including 3D buildings) resulted in significant financial savings.

  - Great example - no cost-benefit analysis

Source: Running a safe and secure major national event with geospatial information, Ordnance Survey UK
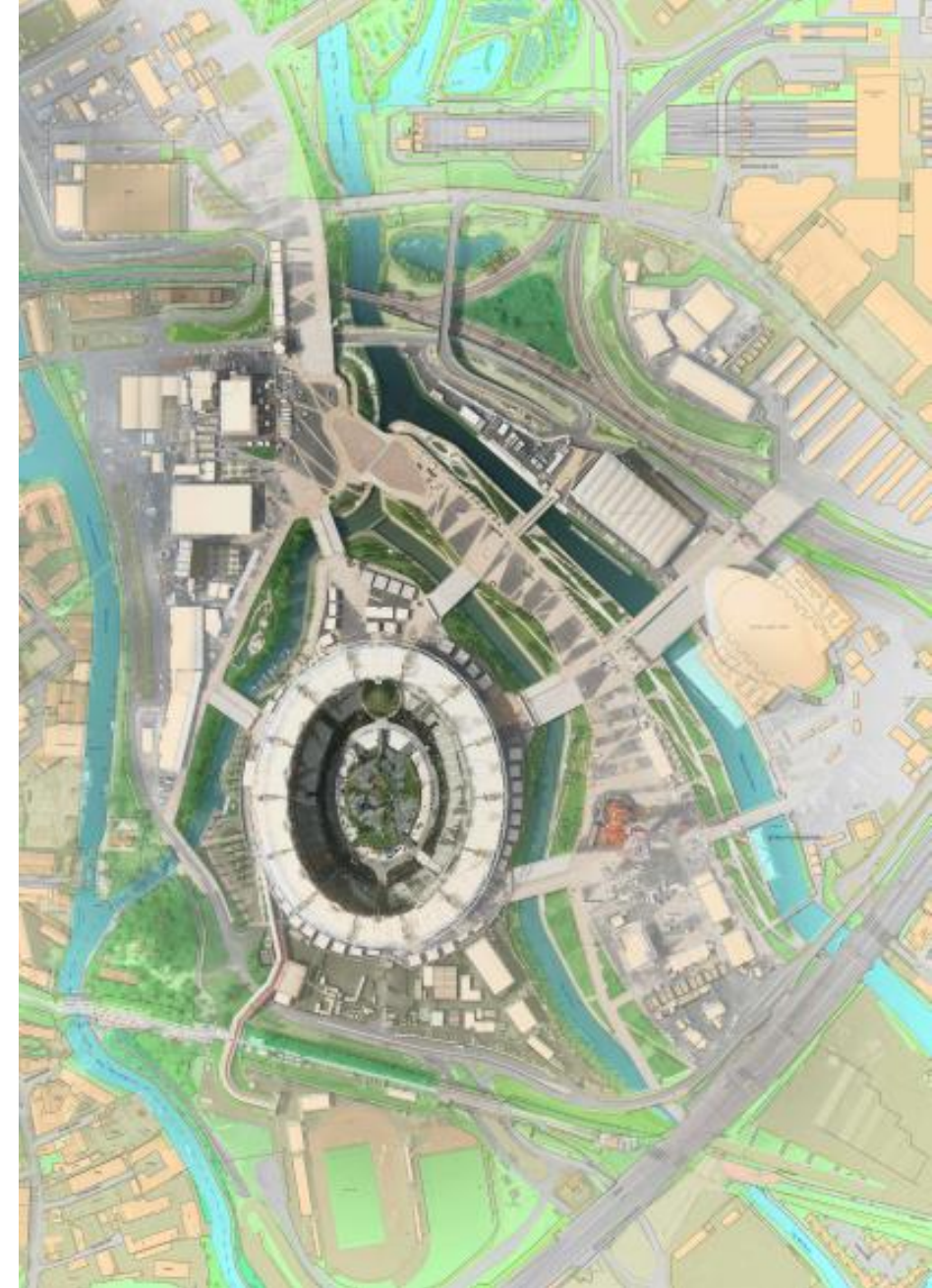
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Results: what we achieved

- Reference material: **Homeland Security and Law Enforcement** (source: USGS)

  - Many agencies responsible for homeland security use **LiDAR data for viewshed analyses** to determine "what can be seen from where" because many threats are based on intervisibility between points with different elevations; this application is relevant to most aspects of infrastructure protection, border protection, search and rescue, and special security events.

  - **High-resolution population distribution data** are critical for homeland security because operational activities and policy decisions are significantly influenced by the number of people impacted at different times of the day when incidents occur.

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Results: what we achieved

- Reference material: **Homeland Security and Law Enforcement** (source: USGS)

  - LiDAR and census data as well as ancillary datasets (e.g., land cover, roads, slope, urban areas, village locations, and image analysis) are used to estimate the number of people in residential and non-residential structures at different hours of the day, with phased increases in populations in the morning hours and phased decreases in the evening hours.

  - Assessed Value US$ 126.5m per annum
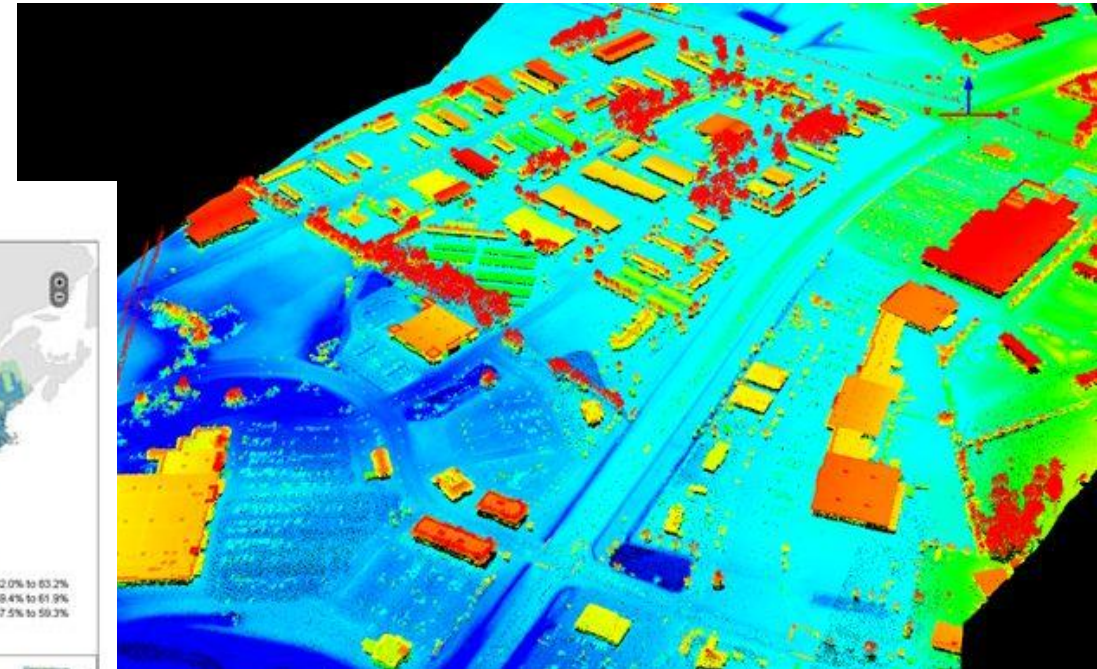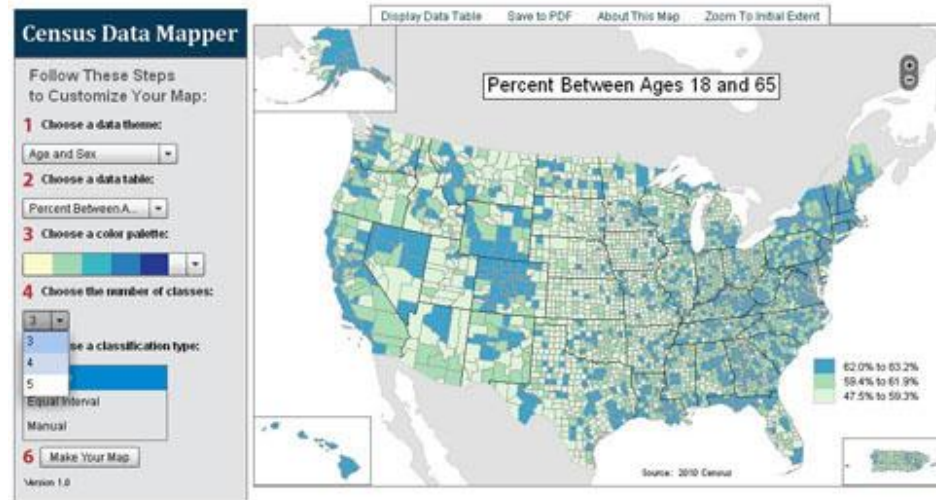
What next

- Assess whether resilience is one of the strongest use cases for your country
  - Analyse value chain materials
  - Rank against political priorities

- Stakeholder Engagement
  - Discuss with emergency response experts
  - Discuss with Defence authorities

- Align to official Government responses to recent emergencies
  - Identify where there is closest alignment of 3D to identified actions

Select

Discuss

Align

Research

Quantify

Present

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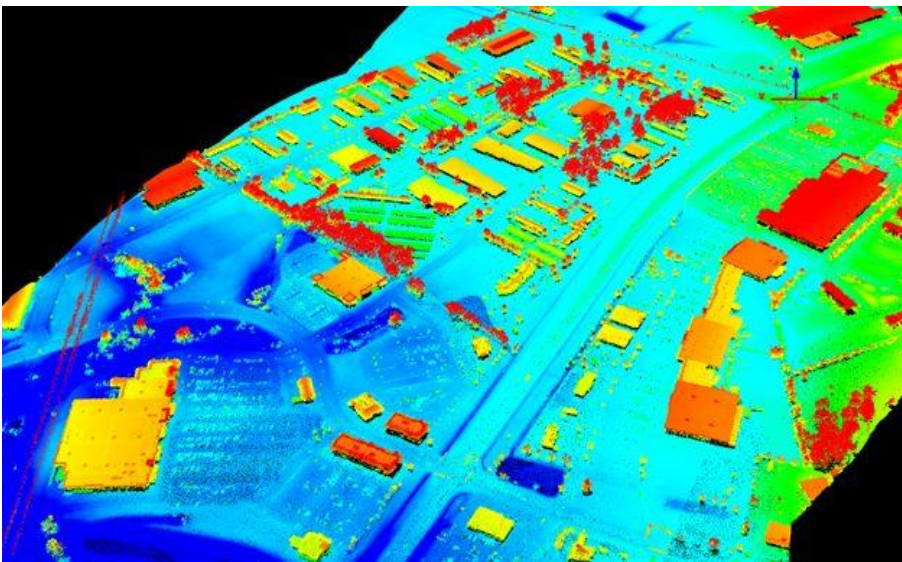Maximising the value of location information

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What next

- Research reports into costs of recent incidents
  - Costs of recent incidents are benefits of avoiding them in future

- Prepare Business case
  - Quantification of cost-benefits difficult but not impossible
  - Look to examples for benefits transfer
    - USGS   Business Use 17. Homeland Security, Law Enforcement, and Disaster Response

- Presentation
  - Defence forces, emergency services
  - Civil Contingency Coordinators

Select

Discuss

Align

Research

Quantify

Present

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Summary

- Workshop
  - Well attended with Belgian public sector and private sector representation
  - Excellent presentation on geo-information use from Astrid (emergency management operator)
- Value chain substantial complete for routine emergency management but would need more work for security and intelligence users
- Benefits identification good for those areas covered
- Good reference material
  - Ordnance Survey resilience direct
  - USGS Study
- Little publicly available evidence to allow quantification
  - Business case likely to be more politics than economics based

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Thank You