Challenges with obstacle data for manned and unmanned aviation

3D GeoInfo Conference

October 1 & 2, 2018

Delft, the Netherlands

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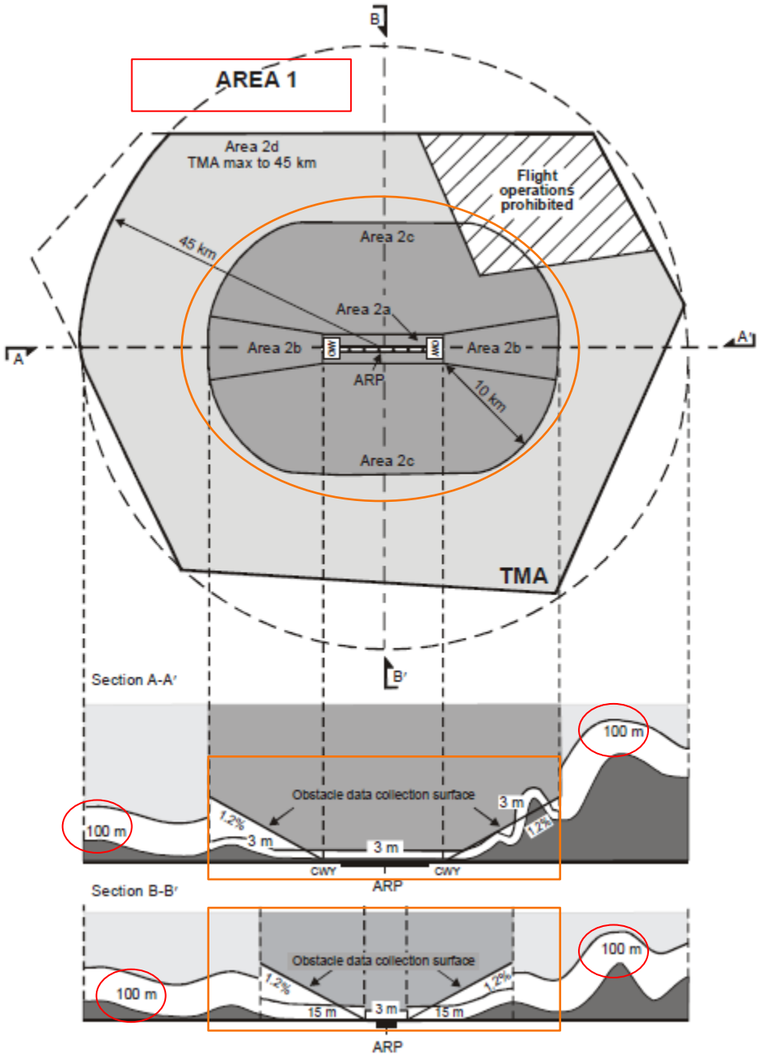
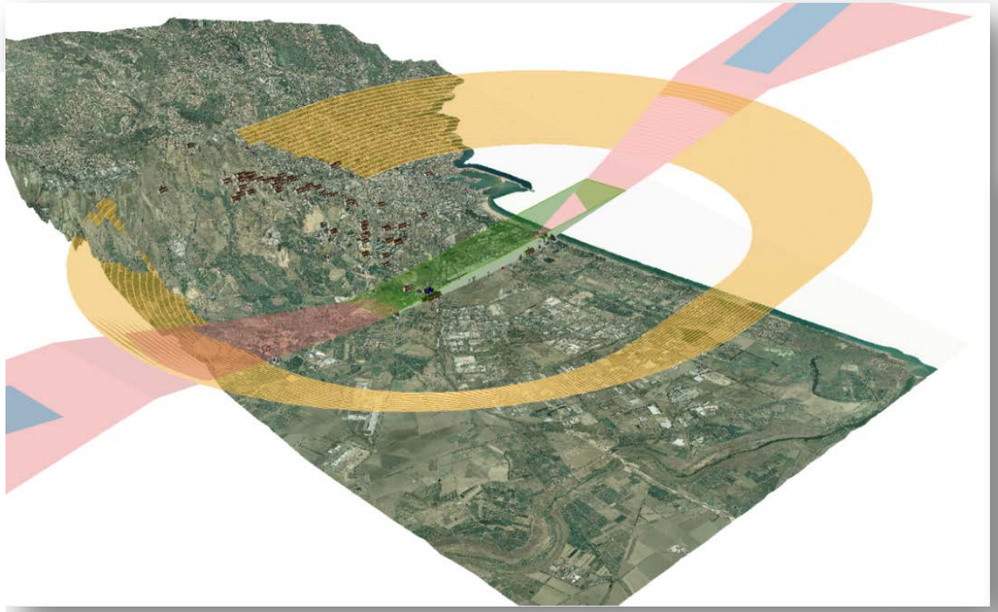
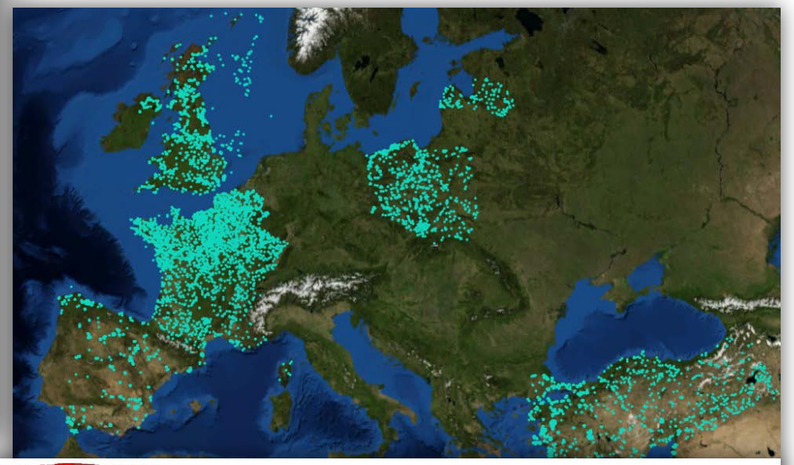
Why aviation needs obstacle data ?

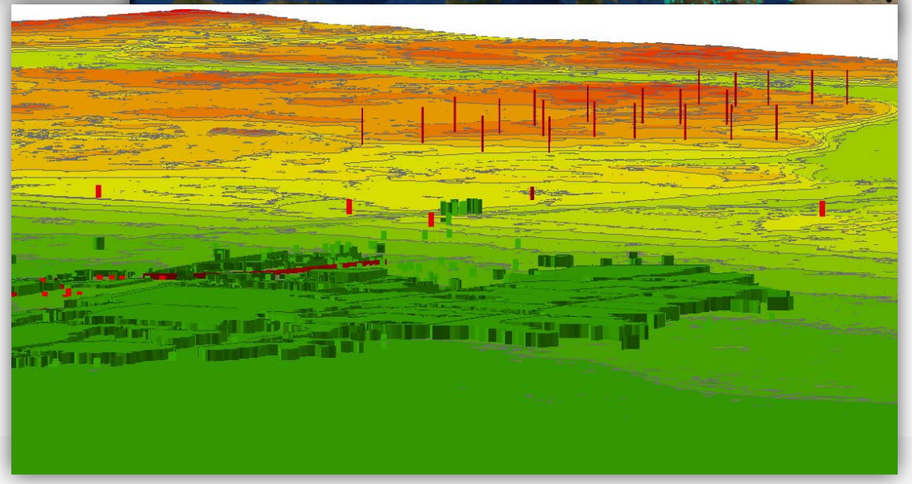
- Various airborne and ground applications require digital obstacle data
  - Ground proximity warning system
  - Contingency procedures and operating limitations analysis
  - Synthetic vision system
  - Etc.

Obstacle data requirements



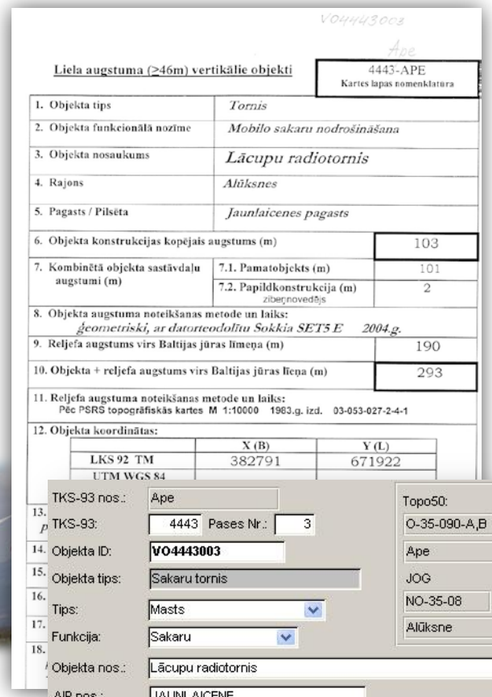


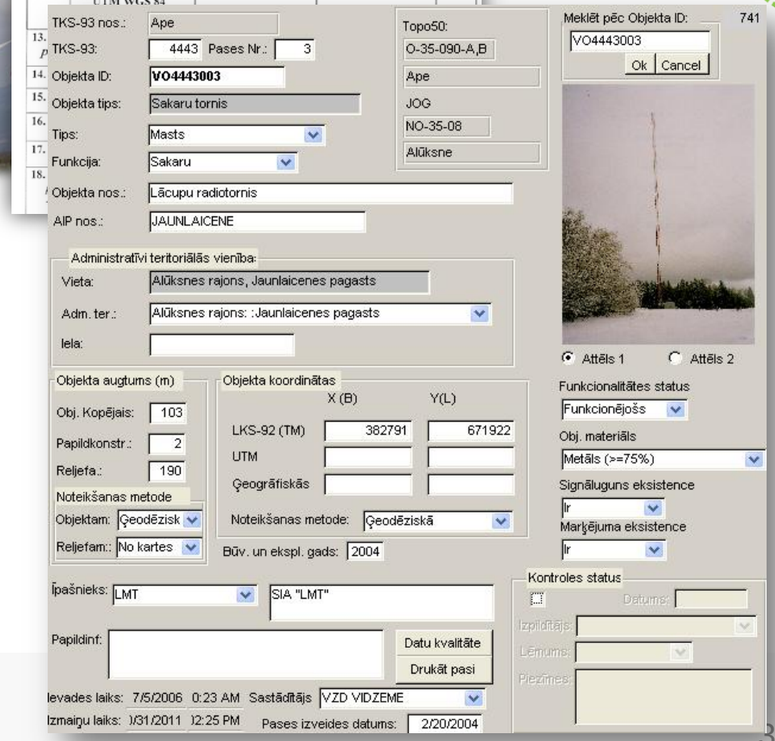


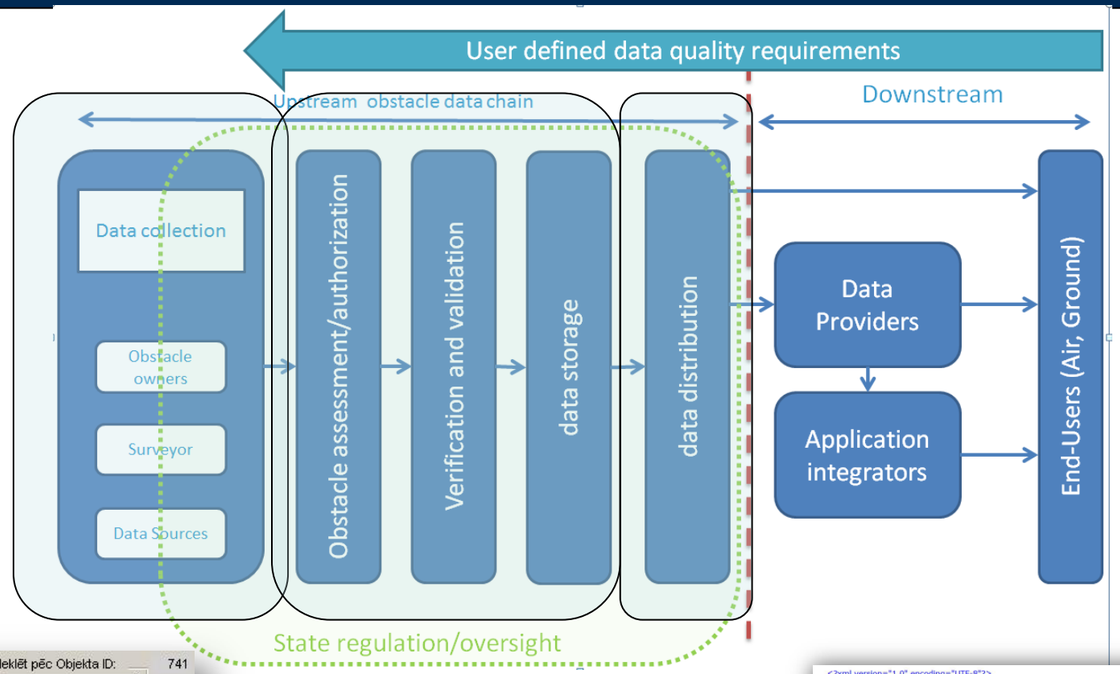


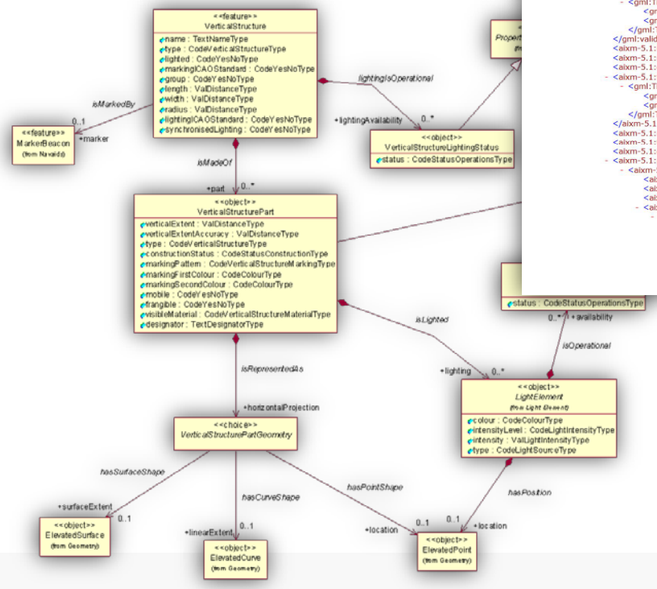
	Area 1	Area 2
Vertical accuracy	30 m	3 m
Vertical resolution	1 m	0.1 m
Horizontal accuracy	50 m	5 m
Confidence level	90%	90%
Integrity classification	routine	essential
Maintenance period	as required	as required

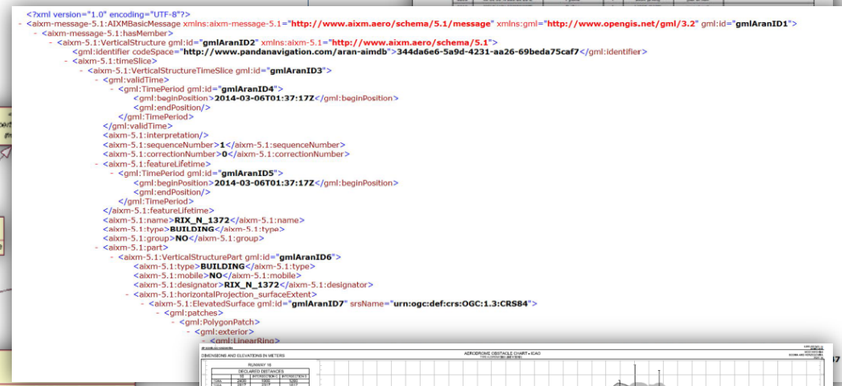
Obstacle data collection

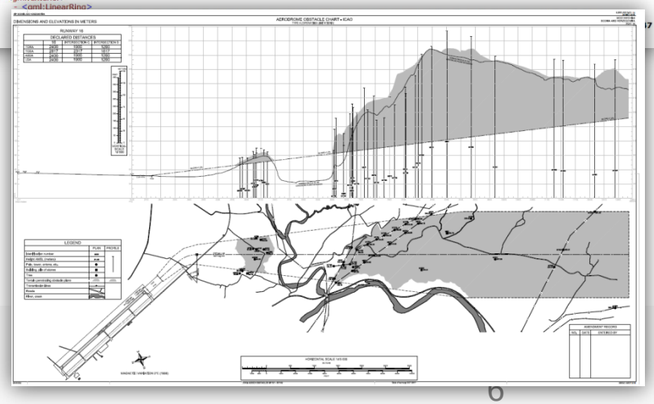












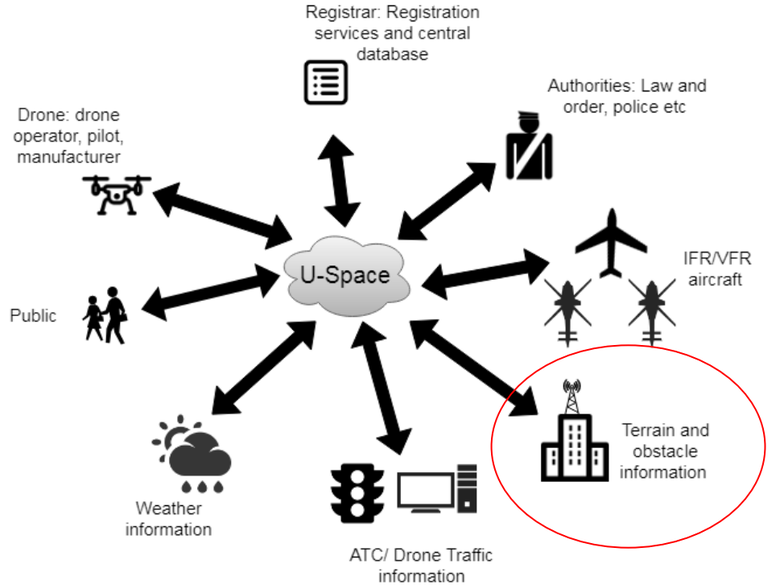
Challenges for novel applications

- Helicopters
  - Missions closer to ground and obstacles
  - Higher accuracy is required v7m h16m
  - Lower collection surfaces 60m

- Drones and Personal Air Vehicles

Drones and Personal Air Vehicles

- High-density drone traffic below 500ft
  - Urban environment operations (above and between buildings)
  - High density of static and dynamic obstacles in BVLOS*
- U-Space
  - Unmanned Traffic Management system for Europe
  - Developed to integrate drones safely into the airspace
  - Requirement: Terrain and obstacle information
- Terrain and obstacle information
  - Needed for static and dynamic geofencing
    - 1 m accuracy (both vertical and horizontal)
    - confidence level of 95 percent
  - Challenge: How do we geofence a construction crane?
    - Tactical geofencing
    - Obstacle information needs to be timely



***BVLOS – beyond visual line of sight**

Looking for solutions

- Accurate digital geometrical data on the man-made structures (obstacle)
  - Potentially 3D in populated areas
- From authoritative sources (liability)
- Regularly updated
- Avoiding current cumbersome process for obstacle data collection

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