UTM – New ground and new opportunities for AIM

Geodata management

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AIM Policies & Plans

Geodata management

DFS Deutsche Flugsicherung

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   - Modelling the correct (UAS) world
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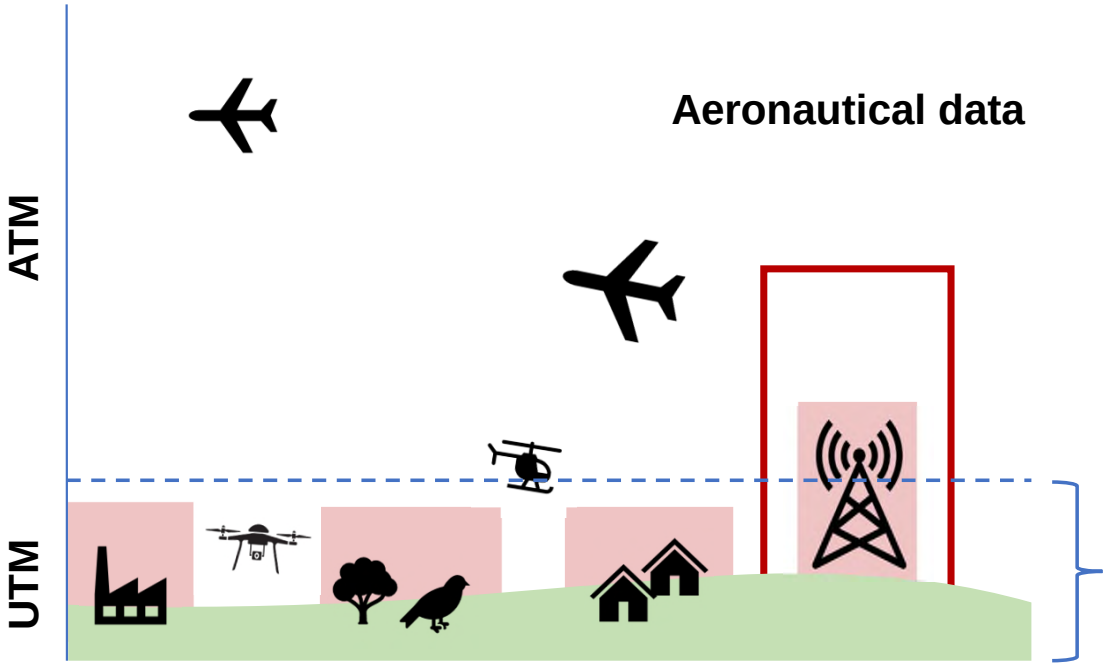
Geodata – New ground for AIM



- Where can we get high-quality geodata?
- What data are required?
- Which geometric accuracy is needed?
- License fees?
- How to model UAS geozones
- How to enrich geozones with additional information?
- How to store and manage such large volumes of data?

In the beginning no data were available!
→ Search for available data sources

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Geodata – Basics

Geodata?

- Geographic data and information
- Explicit association with a location relative to earth
- Attribute table (name, address, height, …)
- Raster and vector data, 3D data

UAS geozones?

- Sensitive or risk areas where drones are prohibited from flying by law
- National law / European law

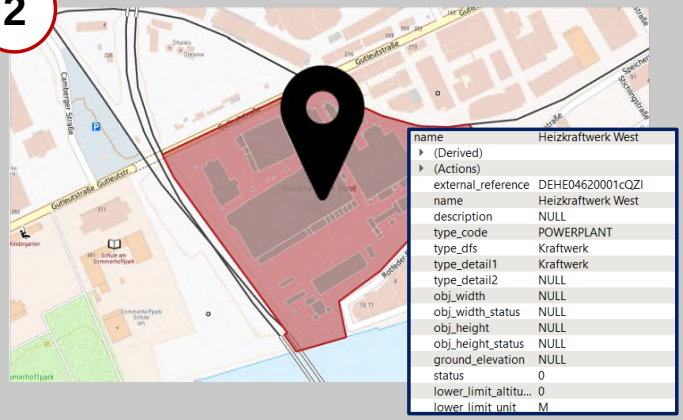
UAS geozones – Interpretation and presentation according to German law

Example ‘power plant’ - no drone flights are permitted within 100 m

1

Search for suitable geodata sources

2

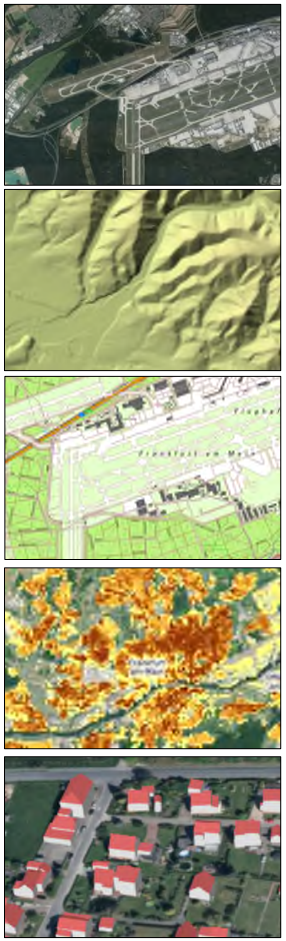


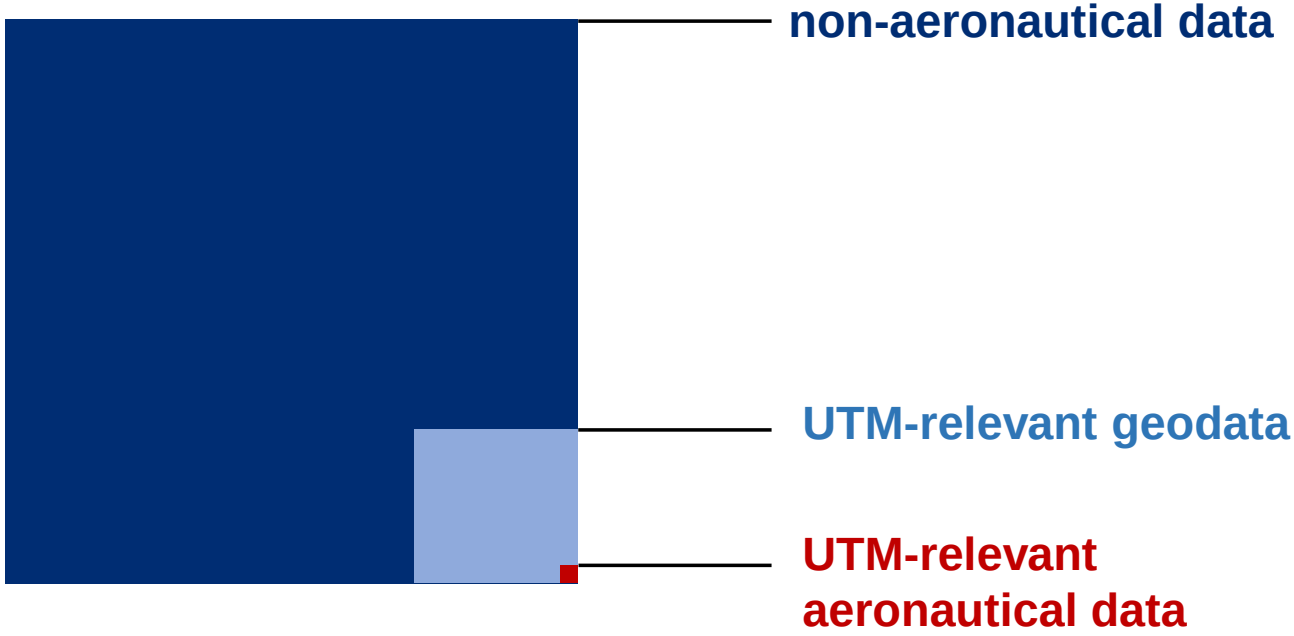
Area definition and enrichment with information

3

Modelling of the exclusion zone based on the 100 m buffer

Geodata – new ground for AIM





➡ **Extensive geodata set with a high potential!**

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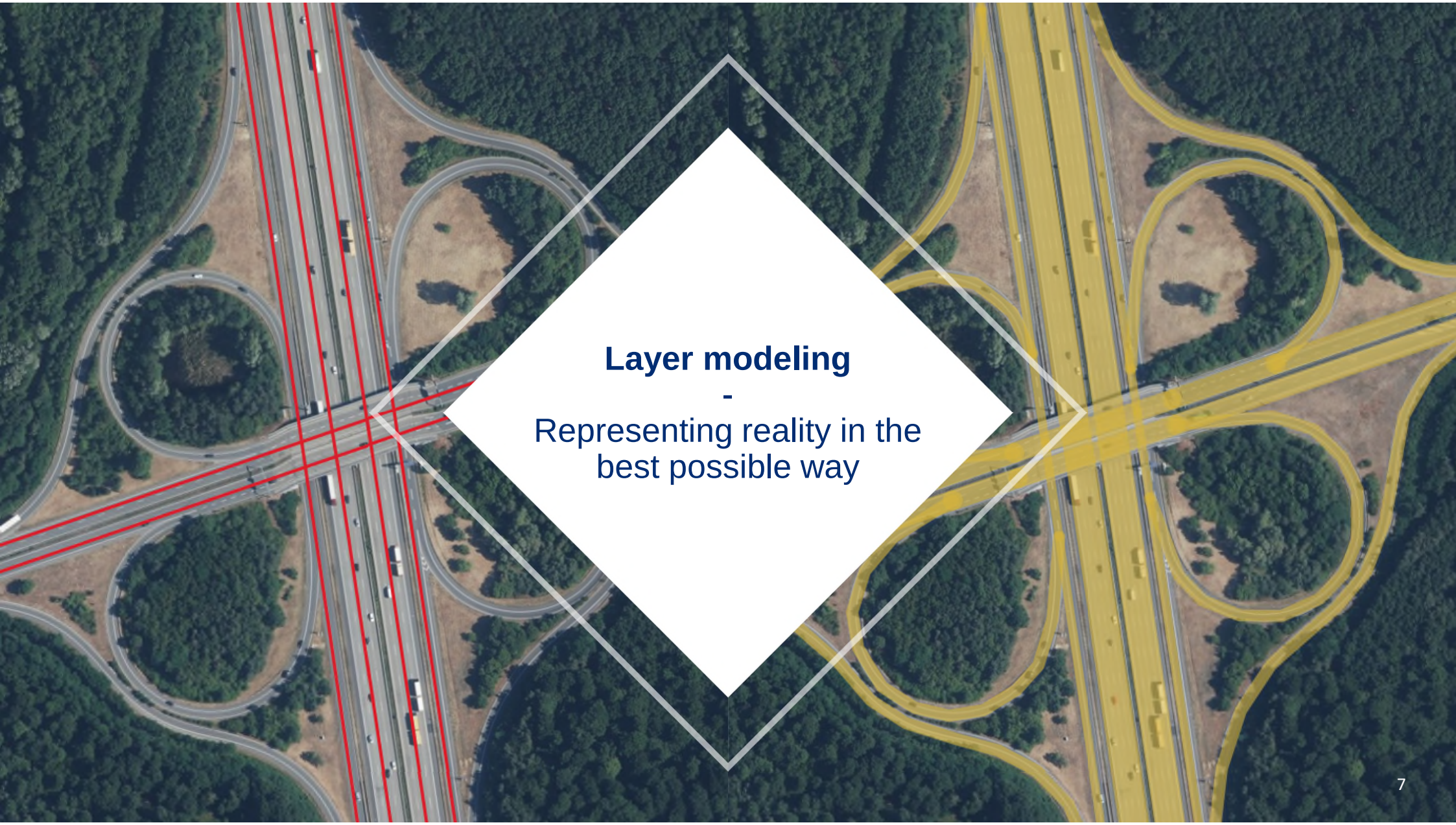


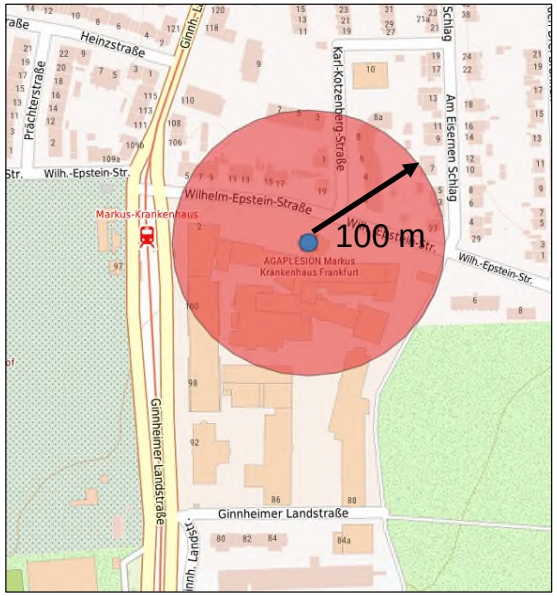
Layer modeling

-

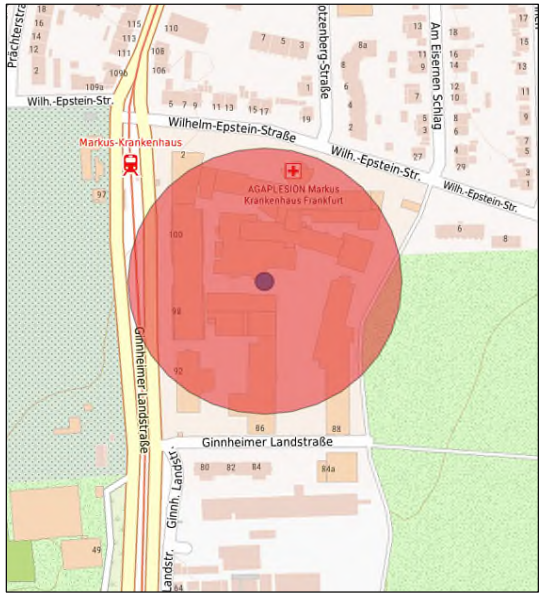
Representing reality in the best possible way

Geodata – reliability and accuracy of UAS geozones

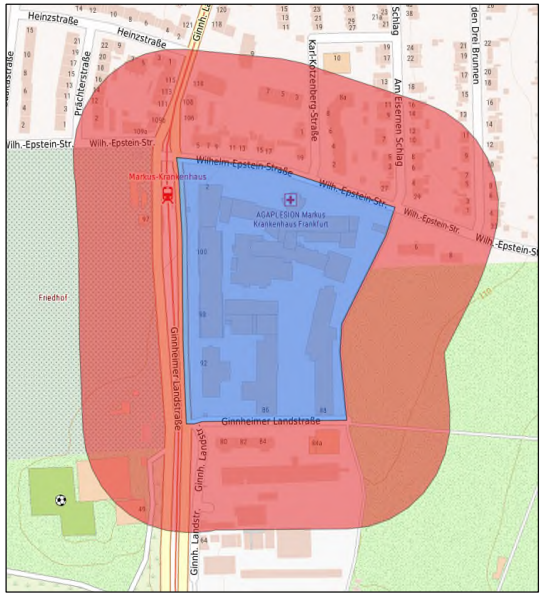
… based on different geometries and sources



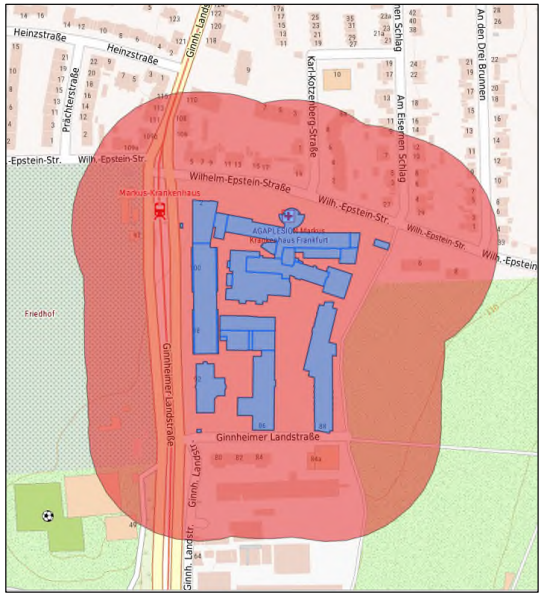
Point
(based on address)



Point, Centroid
(based on property‘s center)



Polygon
(based on property)



Polygon
(based on official building footprints)

Challenges – Legal basis

Examples of the German interpretation of current and applied EU regulations & DFS's approach

UTM system

Clear legal situation
e.g. in control zones of airports or nature reserves

Room for interpretation
e.g. assembly of people, residential areas, industrial areas

Temporary/dynamic data
e.g. opening hours, weekly markets, events, rallies

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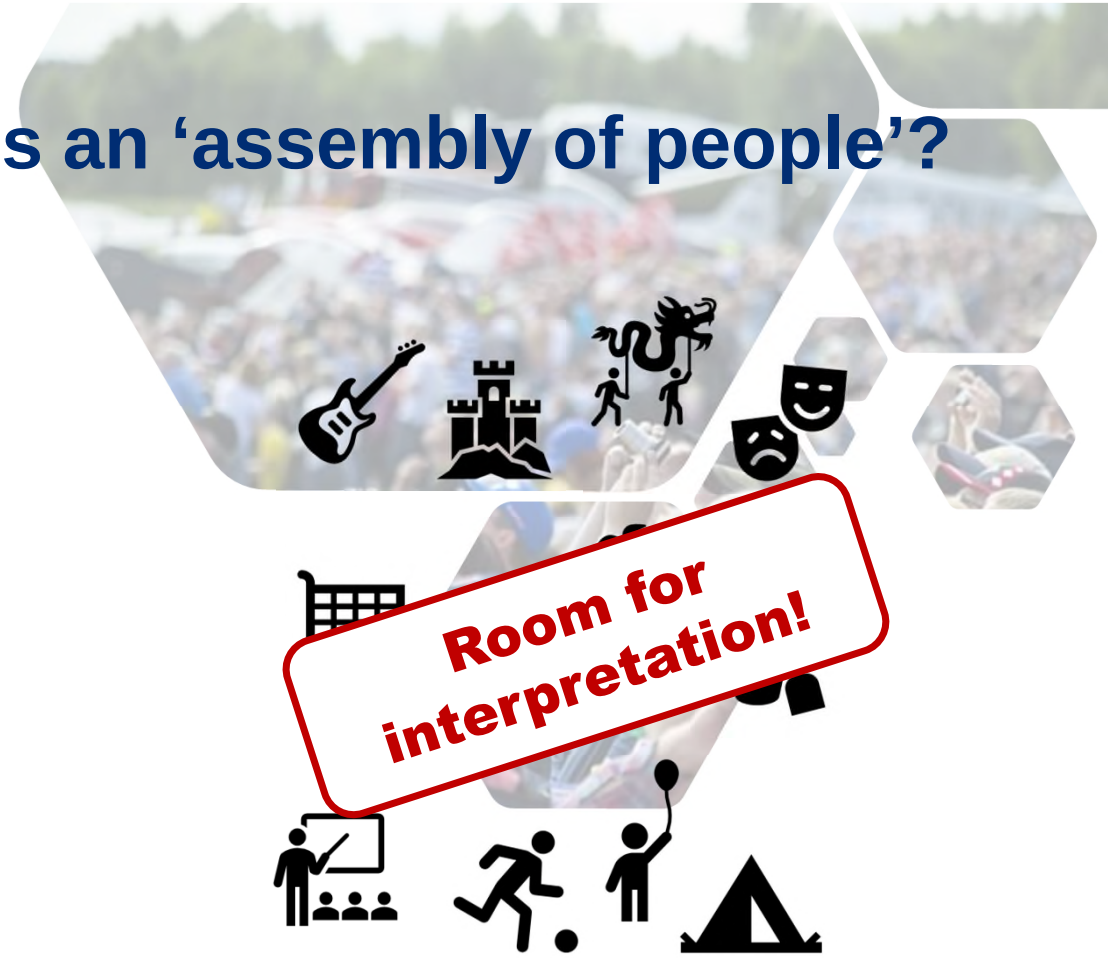
Challenges – What constitutes an ‘assembly of people’?

“An assembly of people is a **crowd** of people. It is **not defined by a specific number of people**, but is related to the **possibility** for an **individual to move around** in order **to avoid** the consequences of **a drone which is out of control**. If a group of people are so densely packed that their **possibility to freely escape** or move away from the drone is **limited**, **then** it is considered to be an **assembly of people**. ”

EASA FAQ 2020



Challenges

1.

Technical requirements

- Large data volume → complex data management
- Data storage and performance

2.

Provision and modelling of UAS geozones

- Different quality and reliability of geodata sources
- Different geometrical representation possibilities (point vs. polygon)
- Validation and processing of geodata
- Extensive research

3.

Interpretation of the European Drone Regulation / national law

- Implementation variations of the EU regulation
- Laws that can be interpreted → definition of UAS geozones

4.

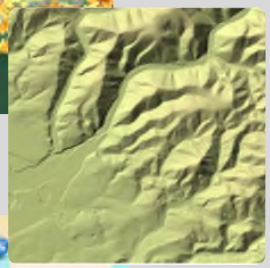
Licensing fees and royalties

- Open geodata vs. official geodata

Opportunities

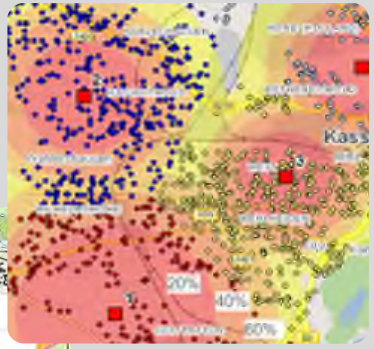
- Established standards for geodata (OGC)
- Introduction of new technologies
- Large data volume and high data quality
- National data provider (GeoDB):
- UAS geozones and geofencing
  - Drone flight corridors
  - Marketing of geodata
- European approach: New European Drone Regulation
  - Consistent legal situation
  - Cross-border flights
- Benefits for ATM

Opportunities – Geodata for ATM



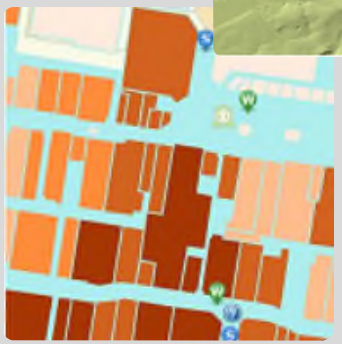
Instrument flight procedure design below FL100

- Population density
- Population distribution



Identification of suitable sites

- Radar systems
- Radio systems
- Building situation
- Protected areas
- Population density
- Digital elevation model



Property Management

- Selection of properties
- Clarification of ownership

Obstacles

- Wind turbines
- Improvement of existing obstacle data
- Actuality and accuracy

Conclusion

- Extensive geodata set with a high potential for benefit
- Accuracies in the range of m and even cm
- New ground with a lot of freedom, but also a lot of ingenuity (research)
- Creativity is required to depict reality as accurately as possible
- High storage capacity and computational performance required
- High degree of standardization of geodata and processing software
- Benefits also for ATM as well as other business areas

Thank you for your attention and stay healthy!

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Software stack DFS

Geodata management

python™

Geodata processing

GeoServer

MapStore

ETL tools

FME

Viewer

- DGM BKG (https://gdz.bkg.bund.de/index.php/default/digitales-gelandemodell-gitterweite-10-m-dgm10.html)
- LOD 2 (https://www.lgln.niedersachsen.de/startseite/geodaten_karten/3d_geobasisdaten/3d_gebaudemodelle/3d-gebaeudemodelle-142891.html)

- Menschenmenge (https://quadrocopter-versicherung.com/)
- Beispiele für ATM: https://www.esri.de/branchen/gis-immobilienwirtschaft https://www.esri.de/branchen/gis-handel-handelsimmobilien/expansion

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