



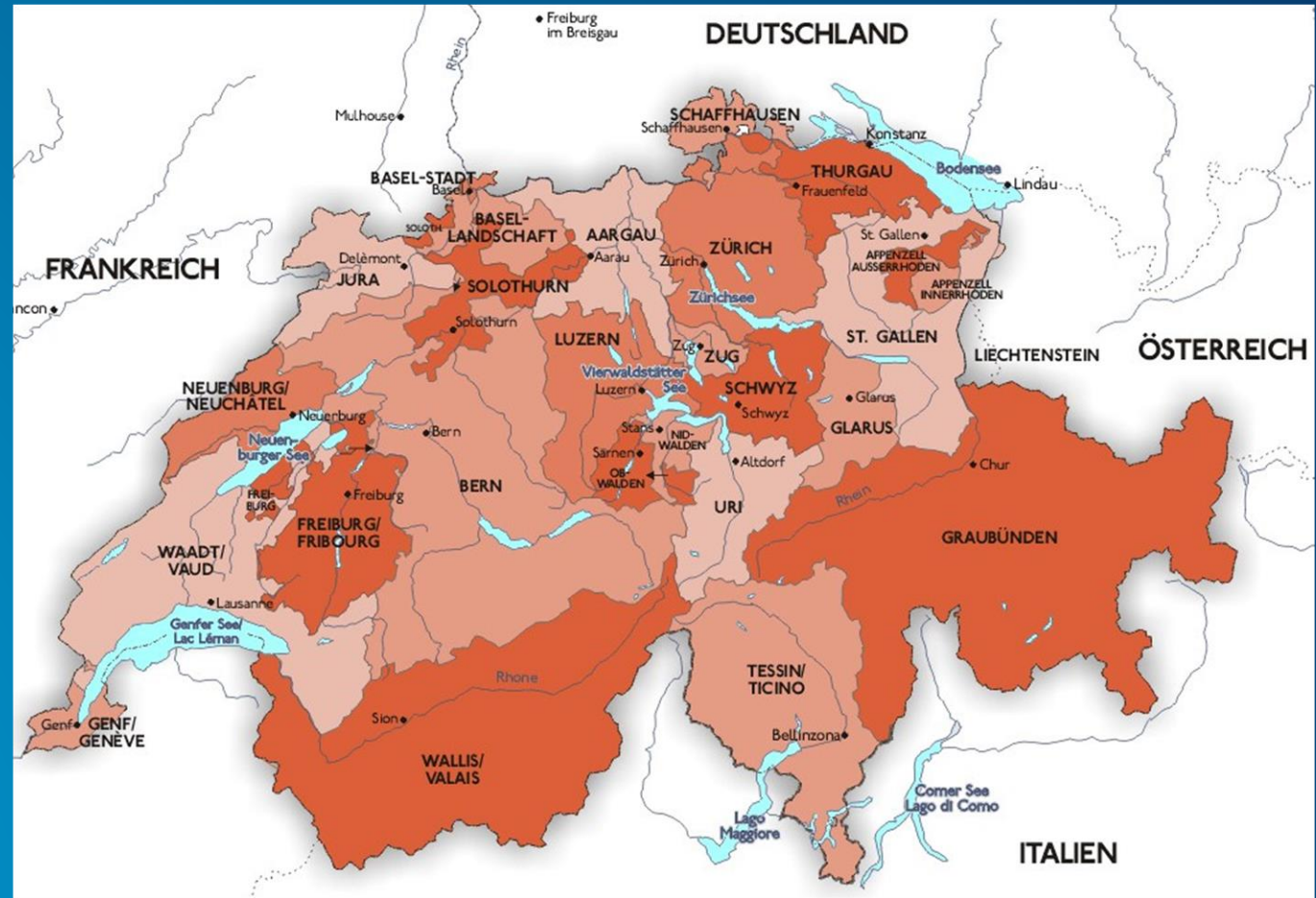
GIS in Swiss Government

Peter Jäger
Esri Switzerland

Switzerland

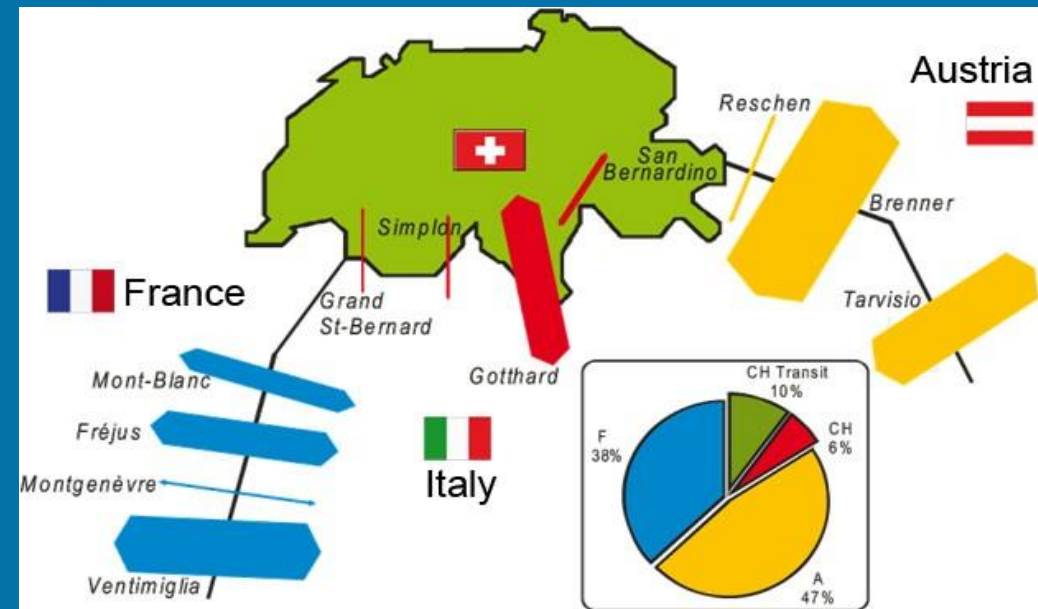
- 8.3 million inhabitants
- 41,285 square kilometres
- 26 cantons
- 2294 municipalities
- 4 national languages

• Zurich	413,000
• Geneva	195,000
• Basel	172,000
• Lausanne	134,000
• Bern	130 000



Switzerland as a Transit country

- 9 million vehicles are crossing the Alps each year
- 1.1 million of which are heavy goods vehicles
- 10 major road transit routes pass through the Alps
- 4 of which via Switzerland
 - Grand St. Bernard
 - Simplon
 - Gotthard
 - San Bernardino



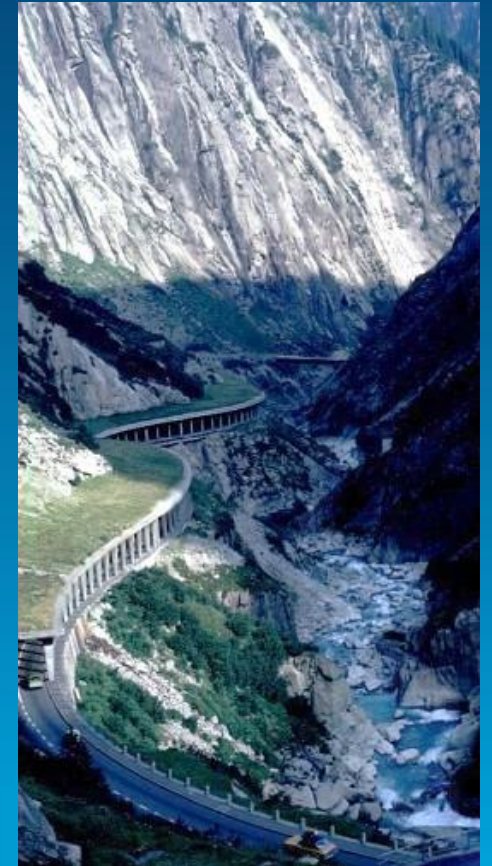
FEDRO

Federal Roads Office

Federal Highway Network: Infrastructure

More than 10'000 engineering structures:

- Bridges, over- and underpasses
- Galleries
- 239 tunnels
- Dams and nets to prevent rock fall and floods
- Noise prevention walls
- Wildlife bridges



Natural hazards

On 31 May 2006, rocks the size of cars fell onto the A2 (Gotthard) motorway near Gurntellen, killing two people.

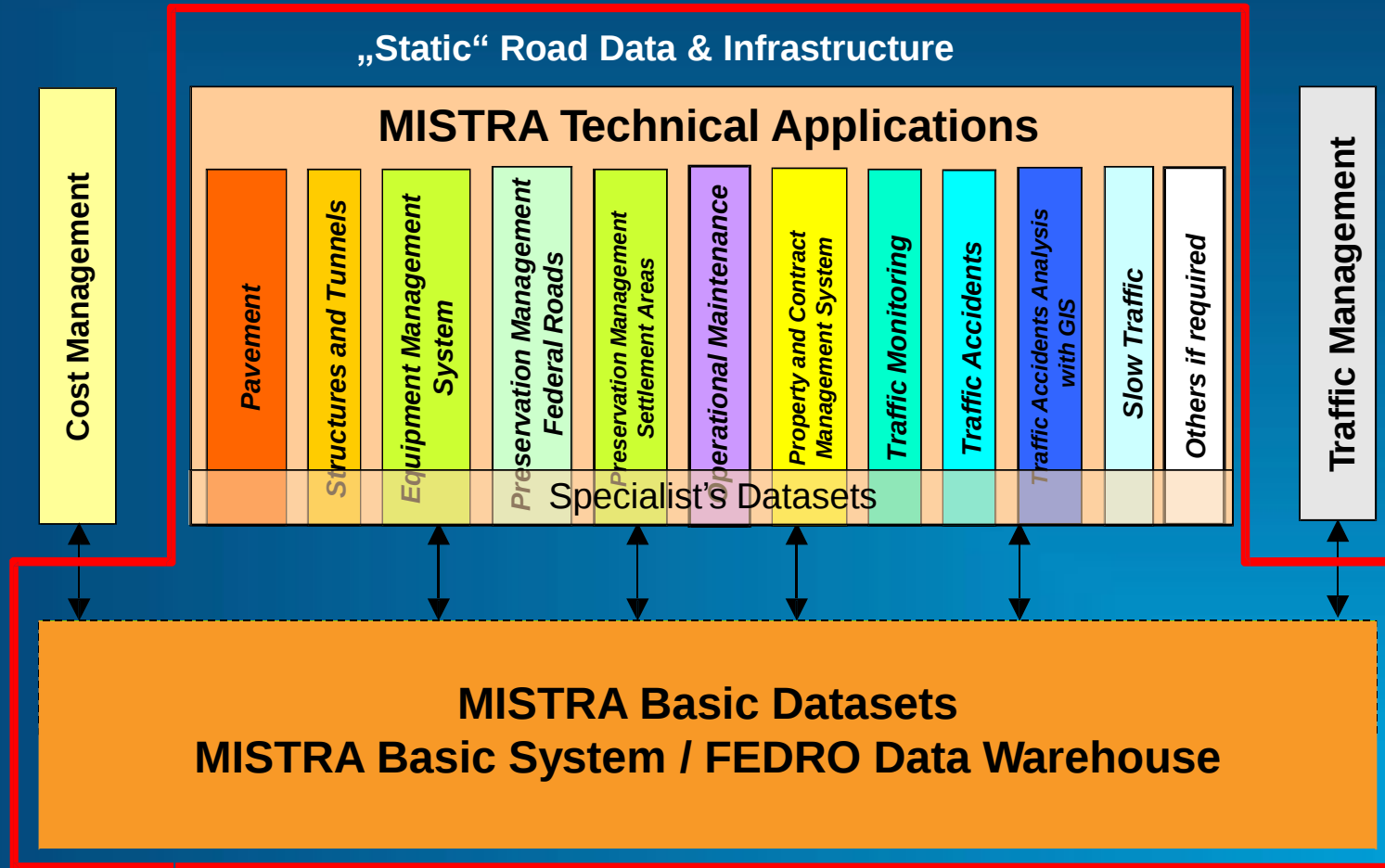


MISTRA - Mission 2004

FEDRO will set up a **Management-Information-System Roads and Traffic (MISTRA)** to support strategic, conceptual and operational Management of the FEDRO scope of functions **Network conception, Network supply** (Planning, Construction, Extension, Maintenance, Operation) und **Network usage** as well as corresponding tasks of professional road owners and network operators referring to roads.

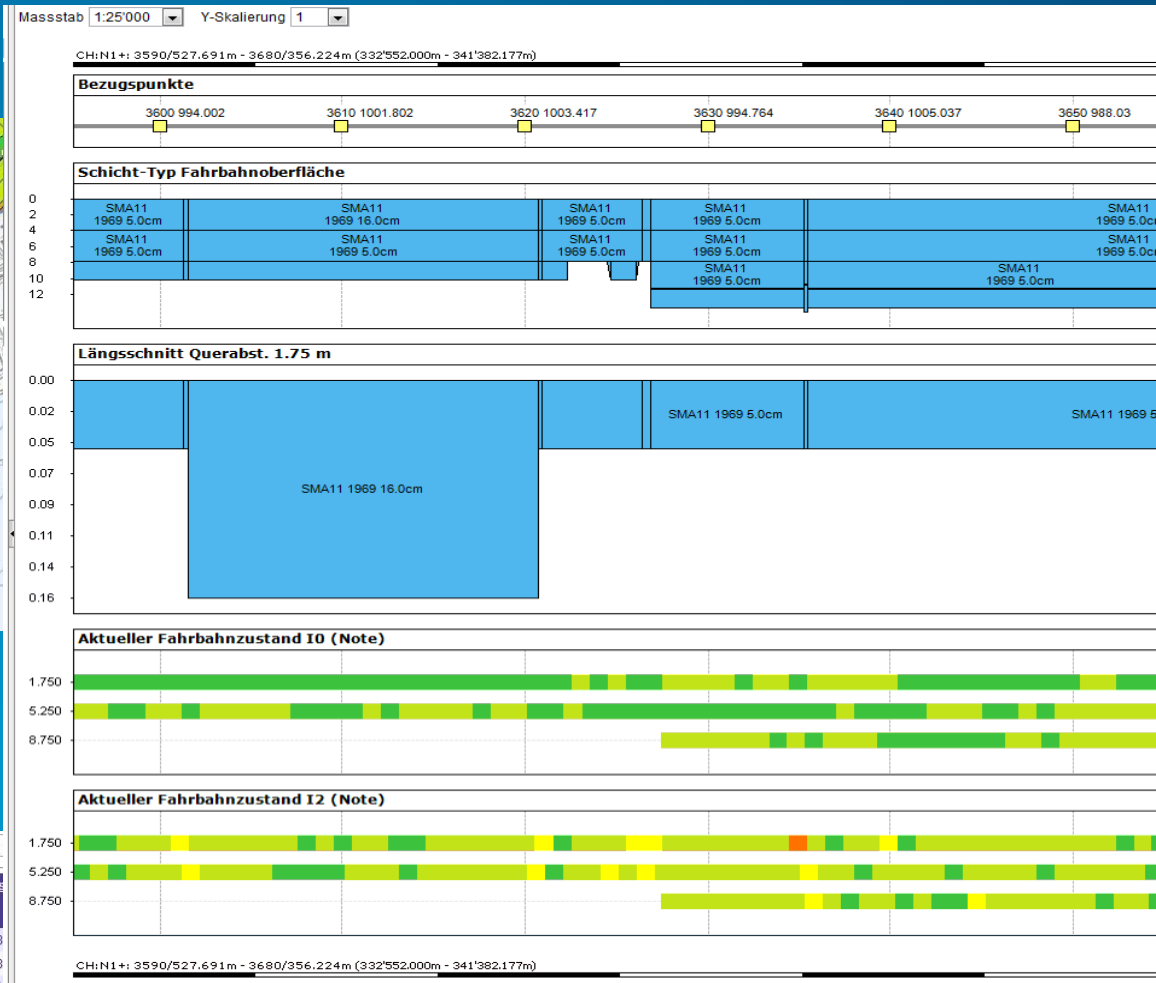
This geographic Information- and Communication-System (ICS) for Roads and Traffic will be created in co-operation with Cantons, Agglomerations and various governmental agencies as well as corresponding technical organizations

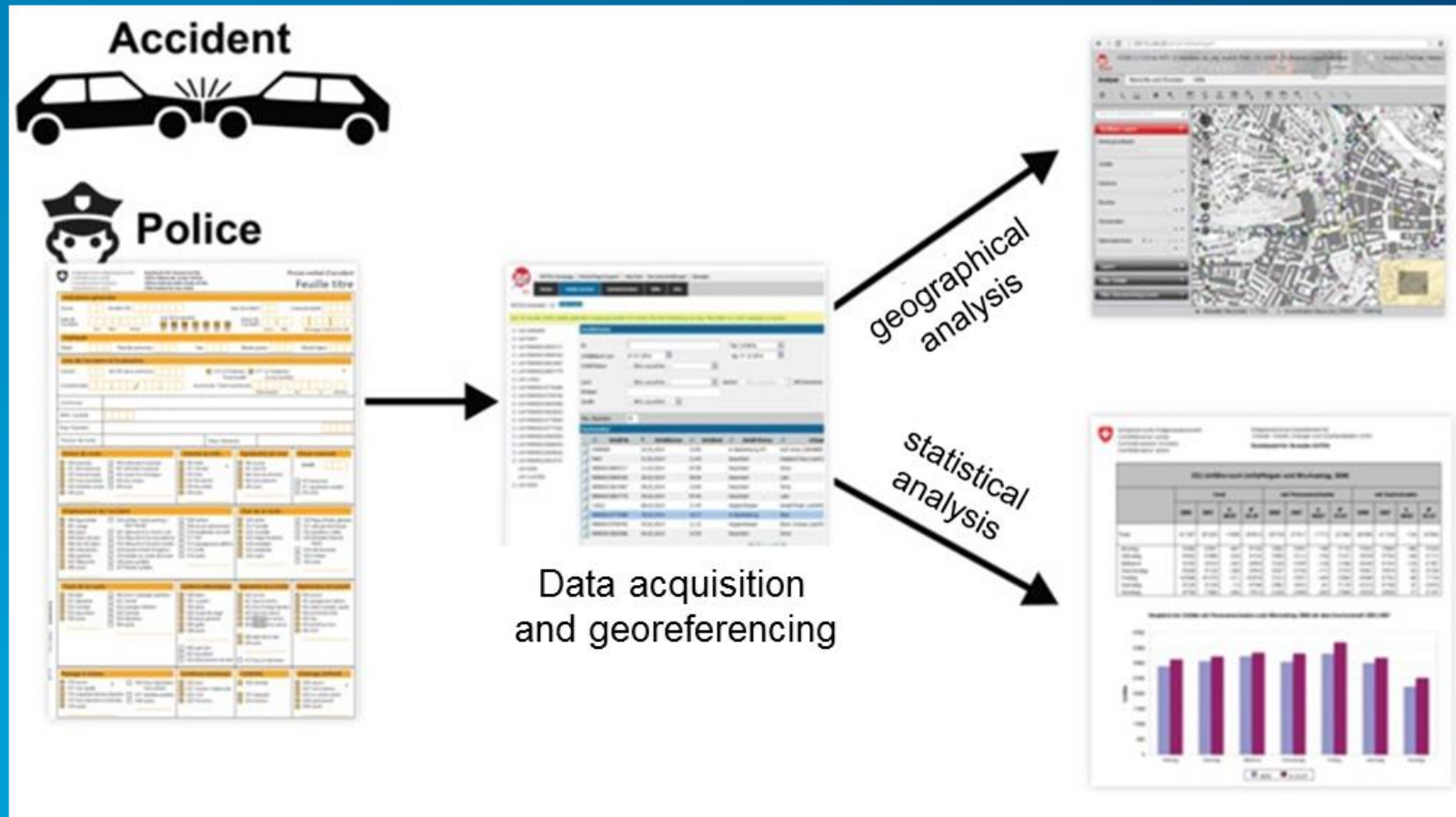
MISTRA - System overview



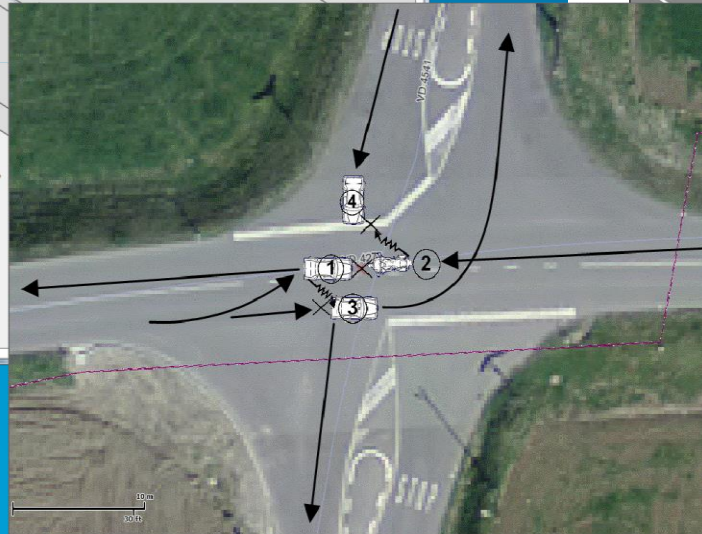
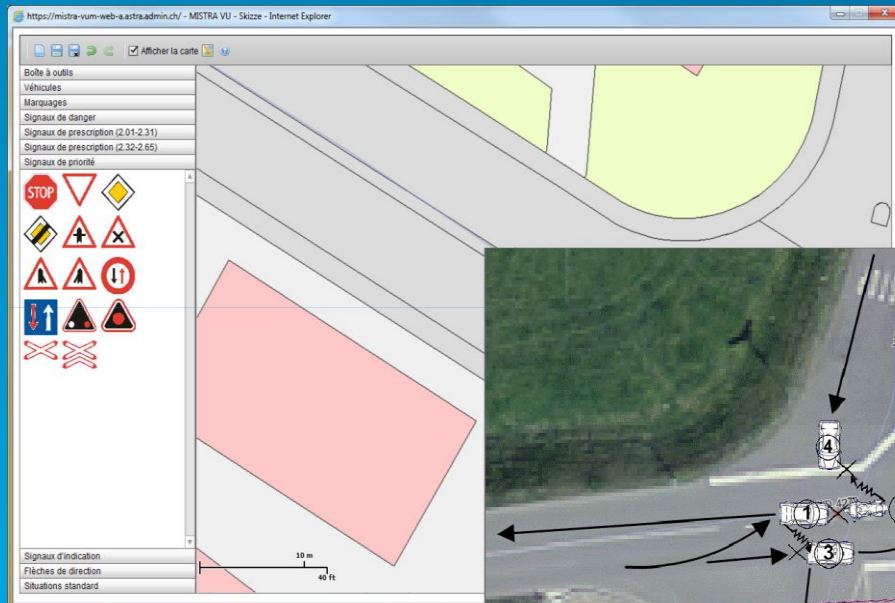
▲ Achse 1	BP Anfang	U-Dist. [m]	▲ Achsdist. 2	BP Ende	U-Dist.
			Anfang [m]		
CHN1+	560	689.000	43'688.640	560	78
CHN1+	560	789.000	43'788.640	560	88
CHN1+	560	889.000	43'888.640	560	98
CHN1+	560	990.000	43'989.640	570	9
CHN1+	570	90.000	44'089.640	570	19

Filter inaktiv - Anzahl Datensätze: 9

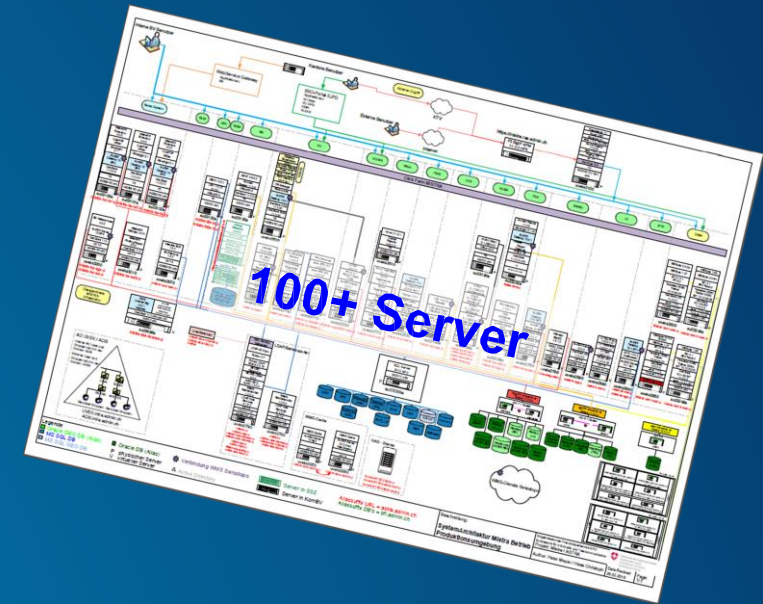




Road Safety and Accidents



MISTRA – some numbers



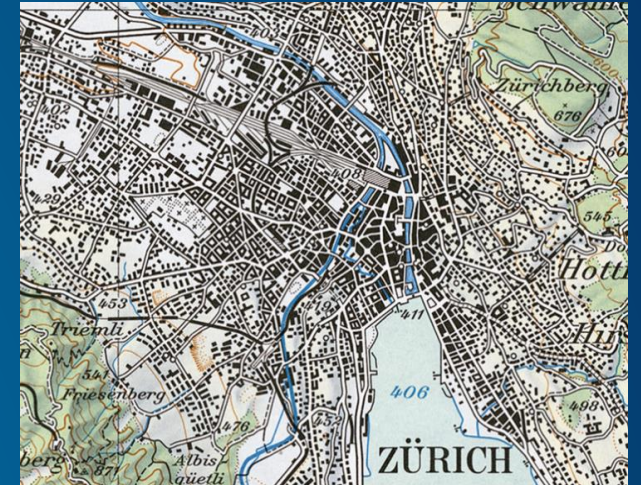
The background of the image consists of several overlapping geometric shapes in various shades of blue, creating a modern, abstract design. The shapes are primarily triangles and quadrilaterals, with some having soft, semi-transparent edges. The colors range from a deep navy blue to a bright, medium blue.

swisstopo

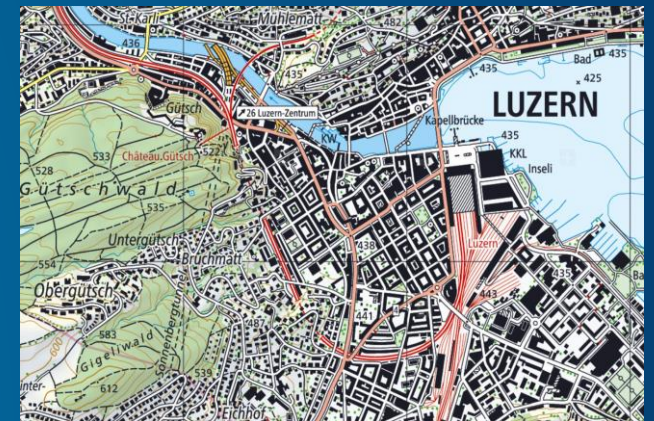
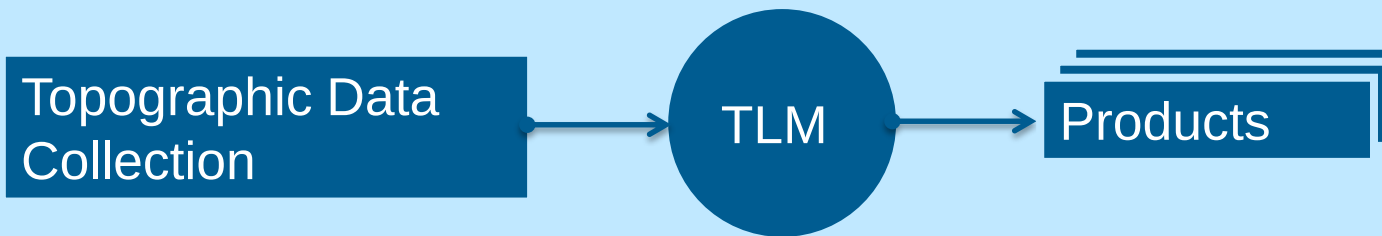
The Swiss National Mapping Agency

Landeskarte 1:25'000 old and new

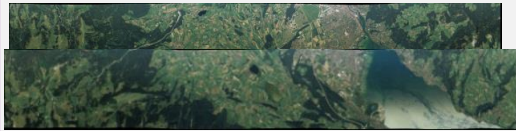
Previous process for collecting vector data



New process for collecting vector data



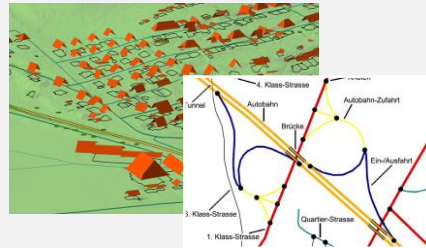
New Data and Map Production Line at swisstopo



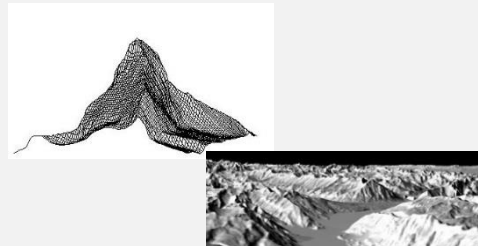
Aerial imagery



Orthophotos



2D and 3D GIS Datasets
Stereo Editing



Terrain models



Digital Maps



Maps

Cartographic Success with ArcGIS

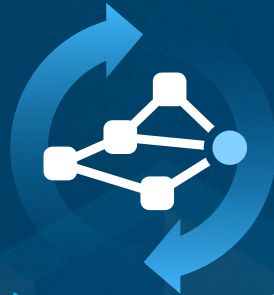
Model
Generalisation

1



Modelling /
Symbolisation

2



3

4

Cartographic
Generalisation

Automatic
Cartographic
Editing

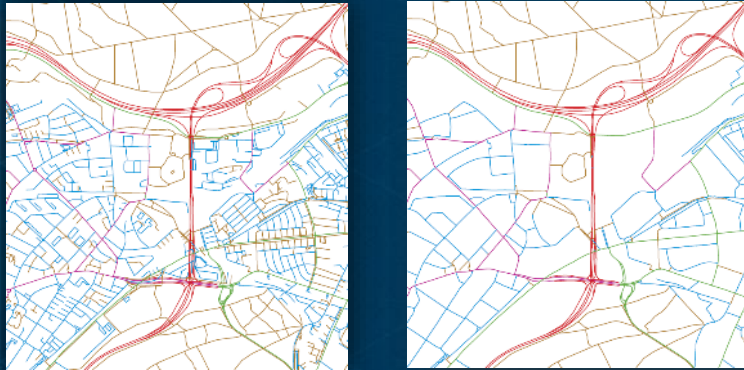
Interactive Editing

5



Generalisierung

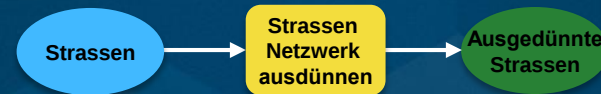
Model Generalisation



Cartographic Generalisation



Automation

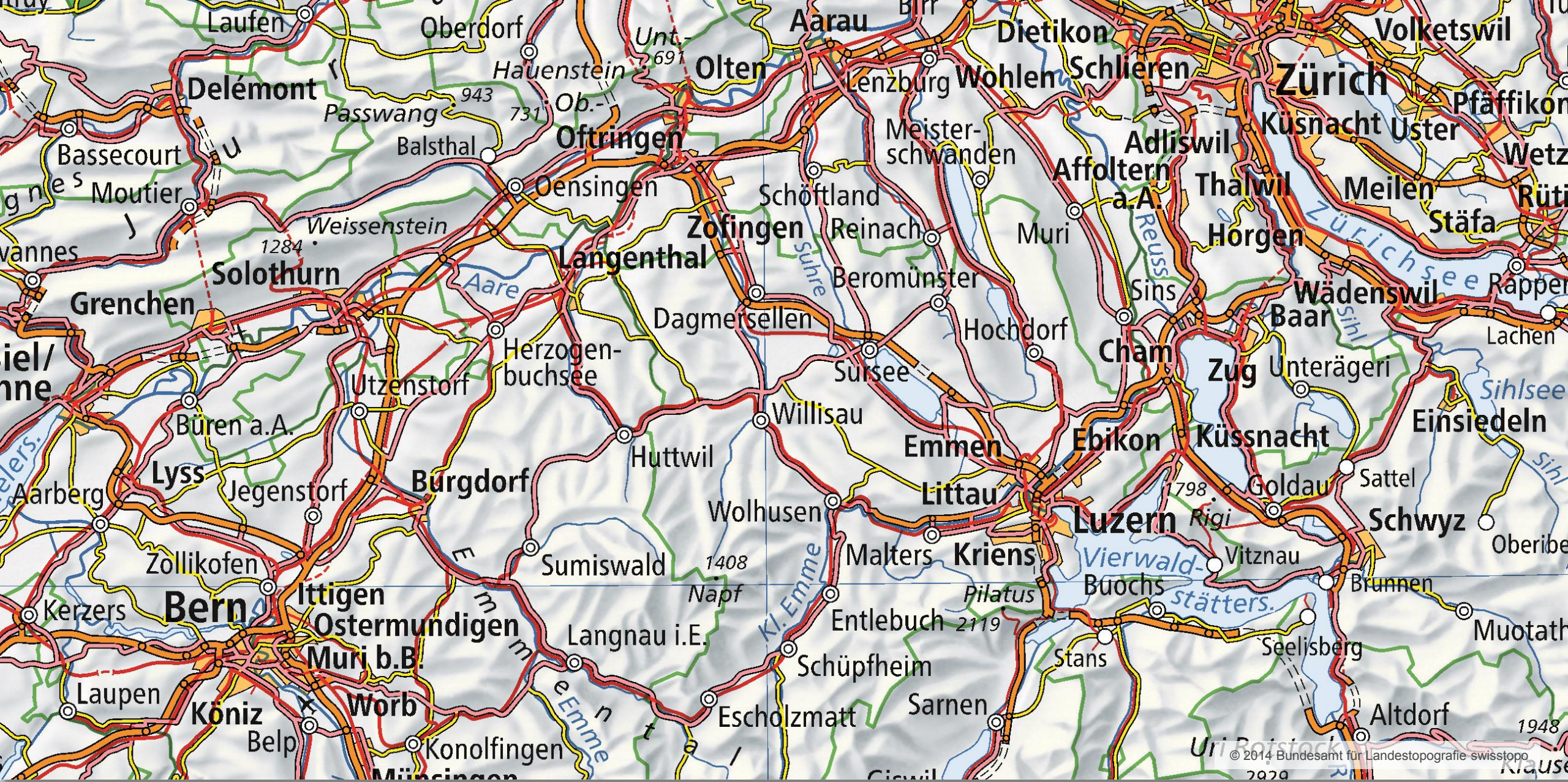


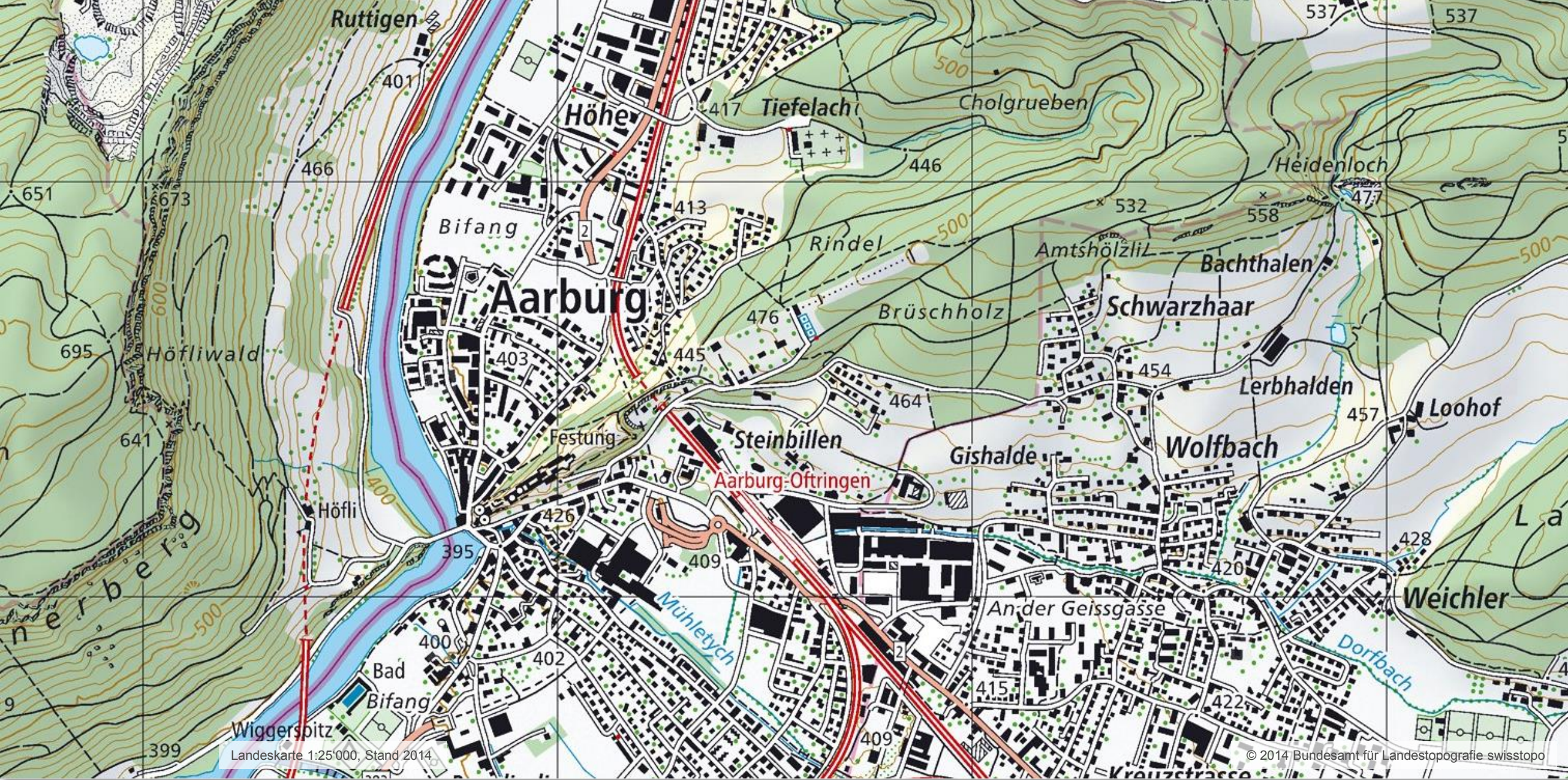
ArcGIS for Desktop

- Cartography Tools
 - Annotation
 - Cartographic Refinement
 - Data Driven Pages
 - Generalization
 - Aggregate Points
 - Aggregate Polygons
 - Collapse Dual Lines To Centerline
 - Collapse Road Detail
 - Create Cartographic Partitions
 - Delineate Built-Up Areas
 - Merge Divided Roads
 - Simplify Building
 - Simplify Line
 - Simplify Polygon
 - Smooth Line
 - Smooth Polygon
 - Thin Road Network
 - Graphic Conflicts
 - Detect Graphic Conflict
 - Propagate Displacement
 - Resolve Building Conflicts
 - Resolve Road Conflicts
 - Grids and Graticules
 - Masking Tools
 - Representation Management

Production Mapping Extension

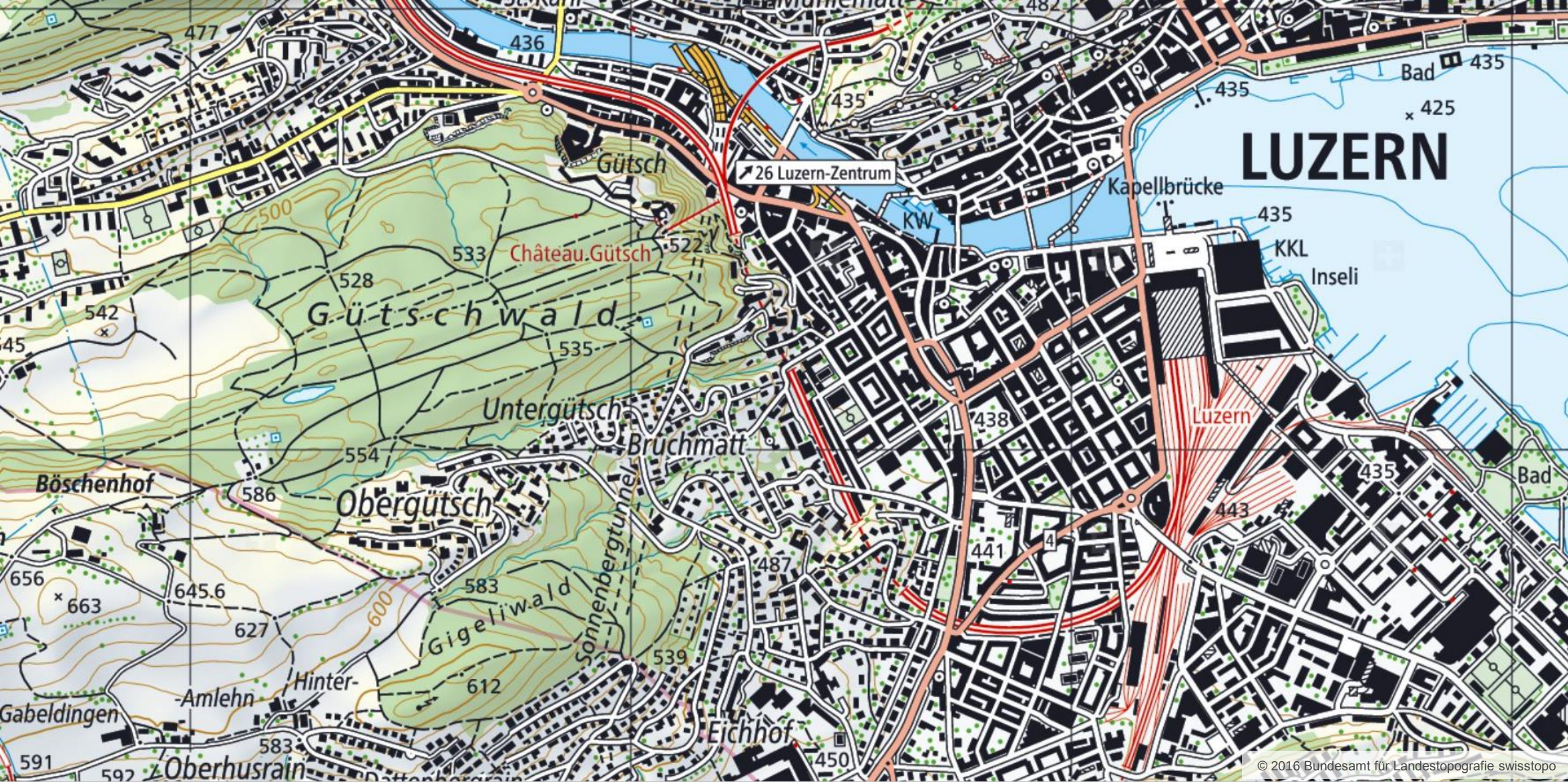
- Production Mapping Tools
 - Cartographic Data
 - Cartographic Editing
 - Conversion
 - Distributed Geodatabase
 - Editing
 - Generalization
 - Aggregate Polygons
 - Convert Polygons
 - Delete Dangles
 - Delete Polygons And Extend Lines
 - Extend Polygon Sides
 - Generalize Shared Features
 - Increase Line Length
 - Increase Polygon Area
 - Modify Underlying Polygon
 - Thin Hydro Features
 - Thin Spot Heights
 - Product Library
 - Surround Elements
 - Symbology
 - Utilities





swisstopo 1:25 000 – Bundesamt für Landestopografie





swisstopo 1:10 000 – fully automated map



1:10'000



1:25'000

Comparison 1:25'000 and new 1:10'000 map



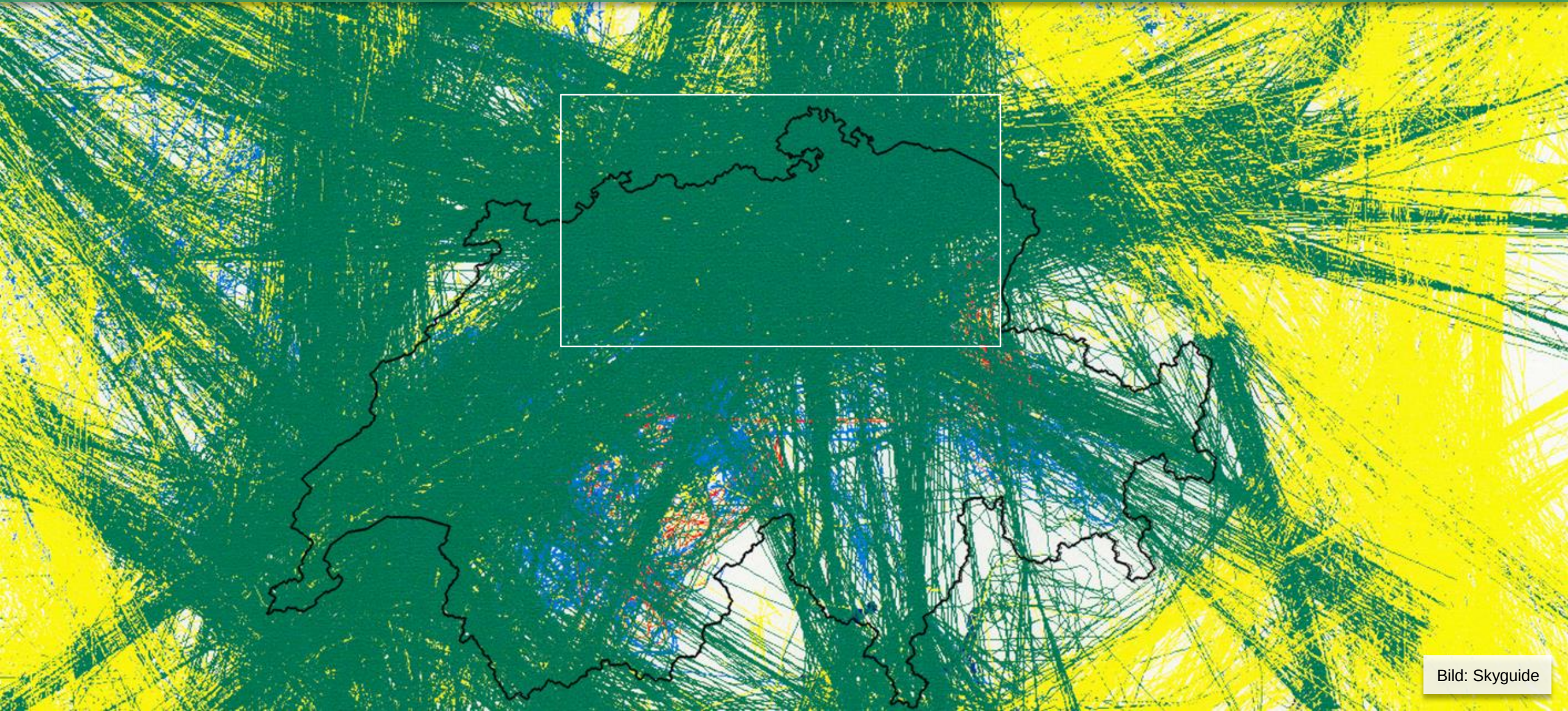
Aircraft Noise

Federal Office of Civil Aviation (FOCA)

European Airspace



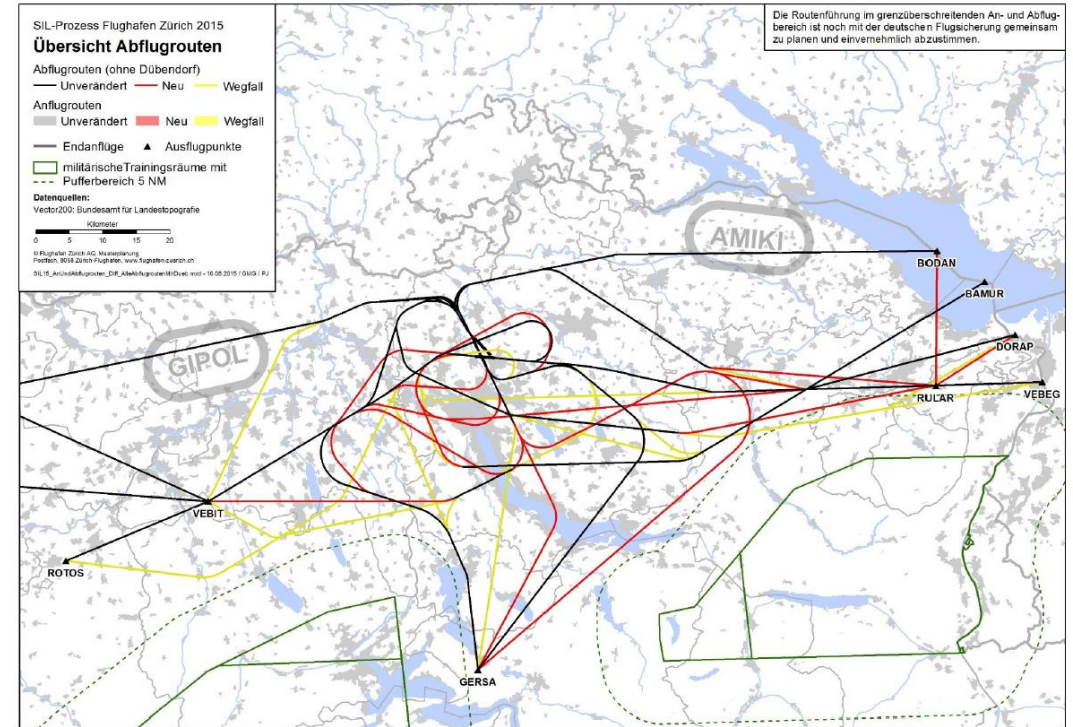
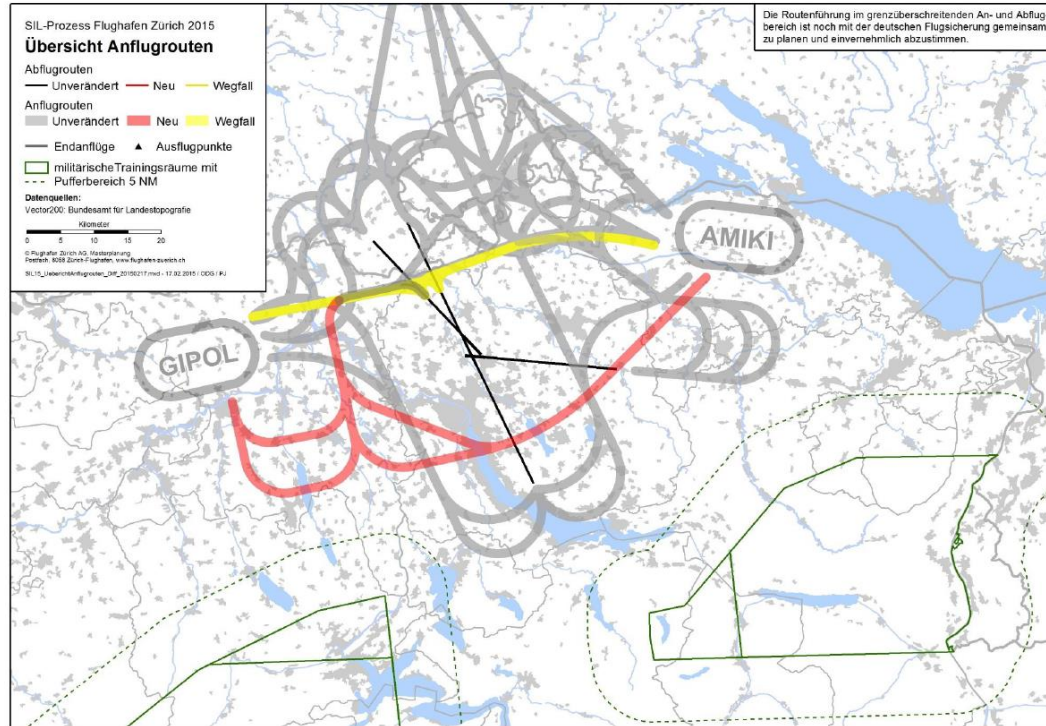
Swiss Airspace



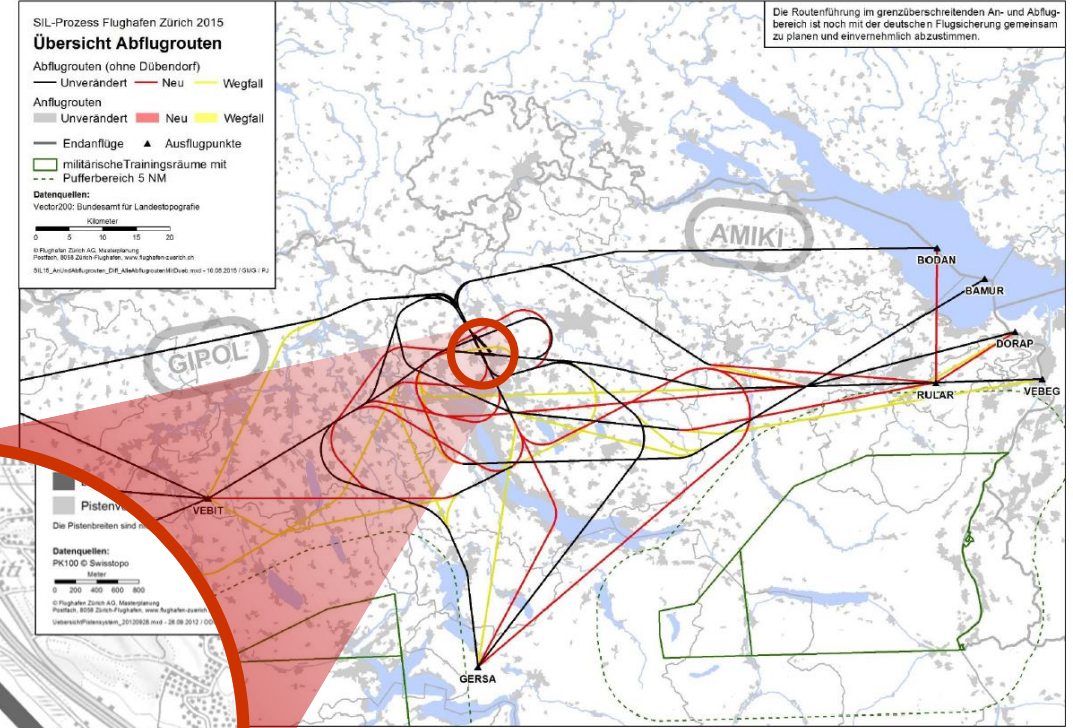
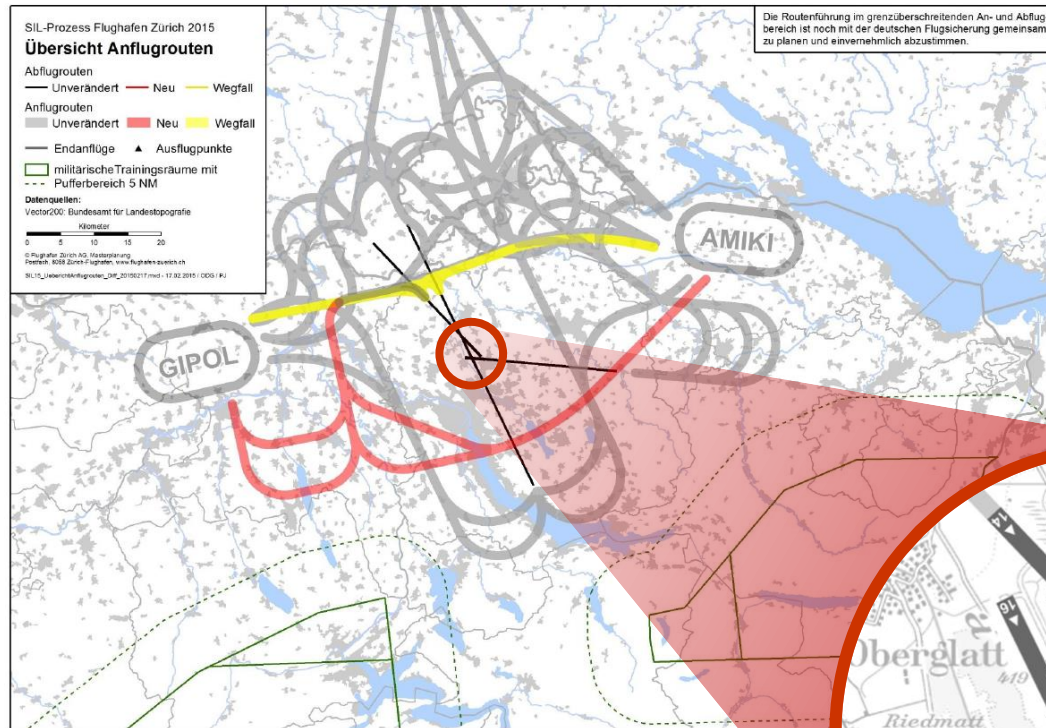
Airspace around Zurich



Complex System at Zurich Airport



Complex Runway System at Zurich Airport



Emotional Discussion

Mehr Fluglärm am Abend über der Schweiz

Die Einigung im Fluglärmstreit verlangt von beiden Seiten Zugeständnisse. Entsprechend zeigen sich Deutschland wie die Schweiz nur mässig zufrieden. Tagesanzeiger.ch/Newsnet berichtete live von der Pressekonferenz.

02.07.2012

Keine neuen Flugrouten
über dichtbesiedeltes Gebiet

Pläne des Flughafens Zürich

Südbaden will neue Flugrouten verhindern

von Andreas Schürer / 21.10.2014, 05:30 Uhr

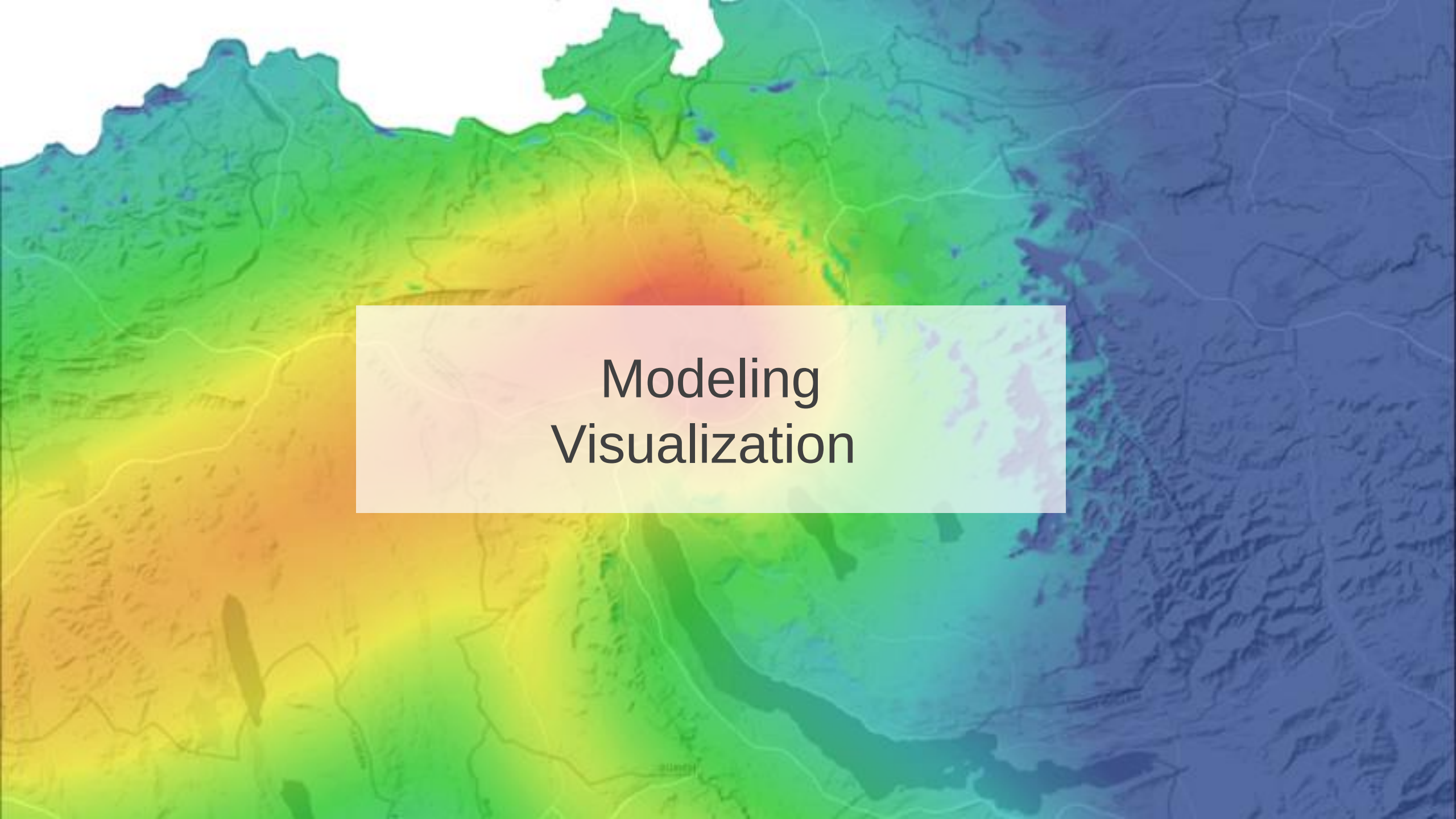
Der Flughafen Zürich will die Landungen aus Osten und Starts nach Norden entflechten – neue Routen wären die Folge. Gar nicht gut kommen diese Pläne in Süddeutschland an.



Idea

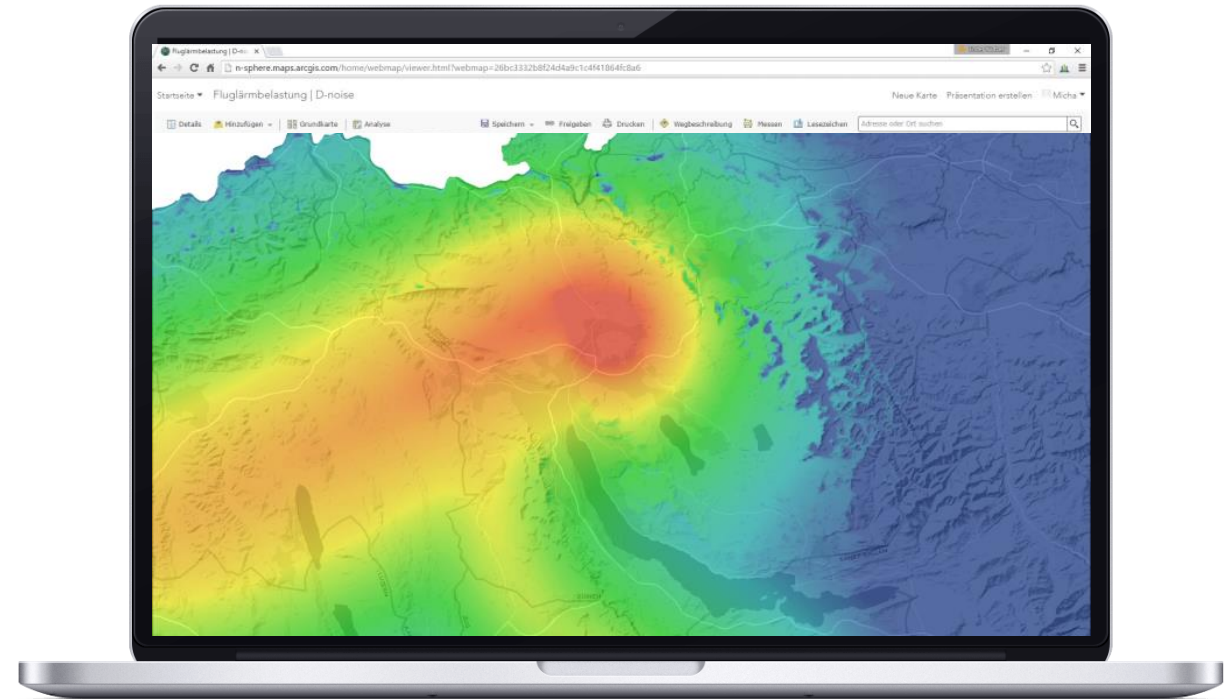


Visualization of Aircraft Noise

A topographic map of a mountainous region, likely the Alps, showing elevation contours and color-coded terrain. The colors range from green and yellow for lower elevations to blue and purple for higher peaks. A semi-transparent white rectangular box is centered over the map, containing the text "Modeling Visualization".

Modeling Visualization

Immission – Today and Tomorrow



Immission – Today and Tomorrow

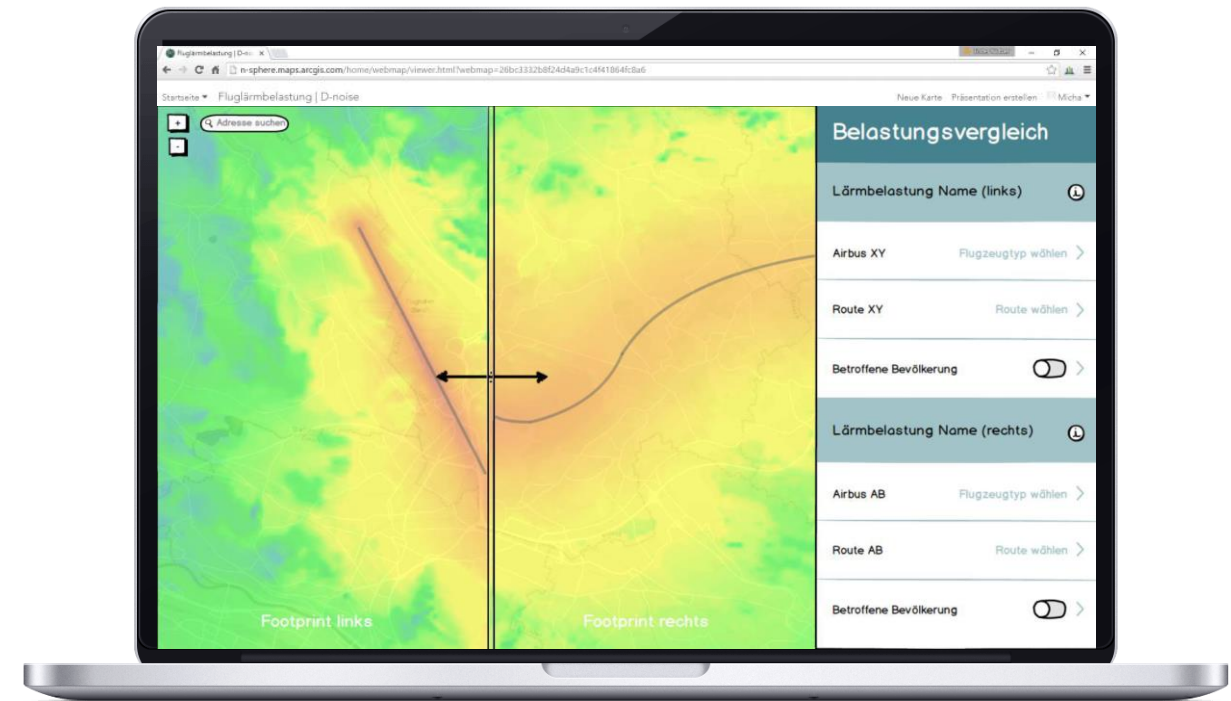
Optimization of Arrival and Departure – Minimization of Immission



Immission – Today and Tomorrow

Optimization of Arrival and Departure – Minimization of Immission

Communication between Experts

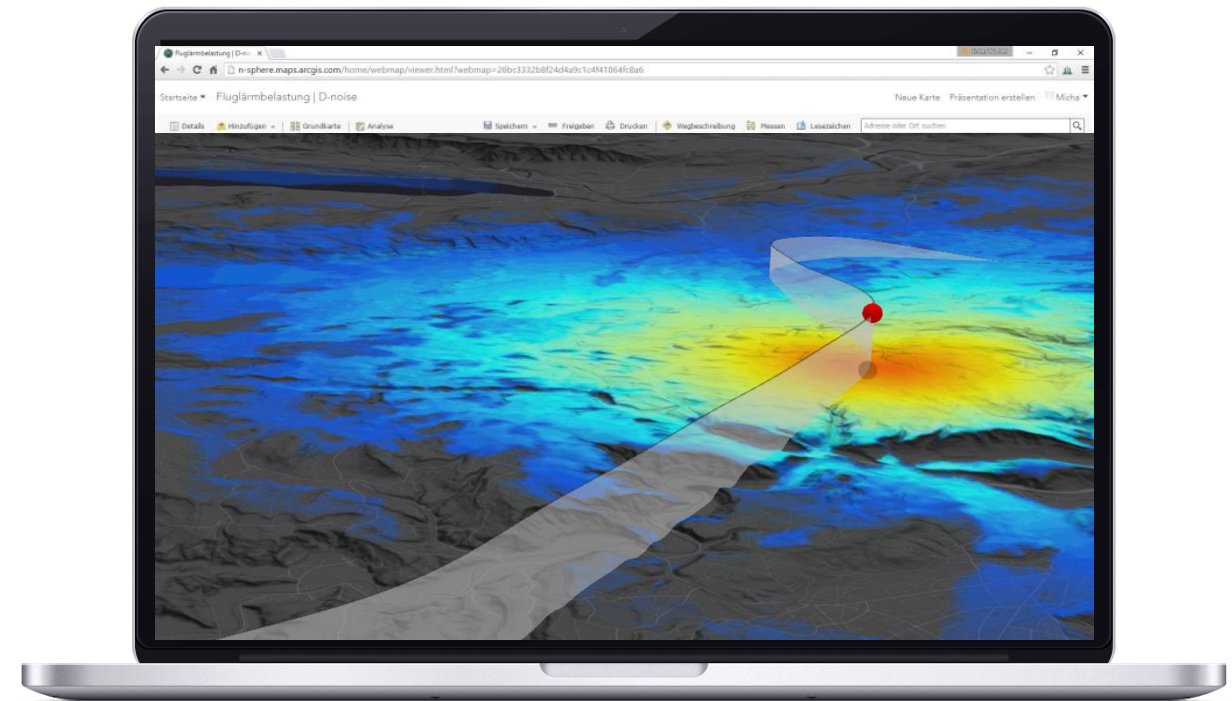


Immission – Today and Tomorrow

Optimization of Arrival and Departure – Minimization of Immission

Communication between Experts

Public Information



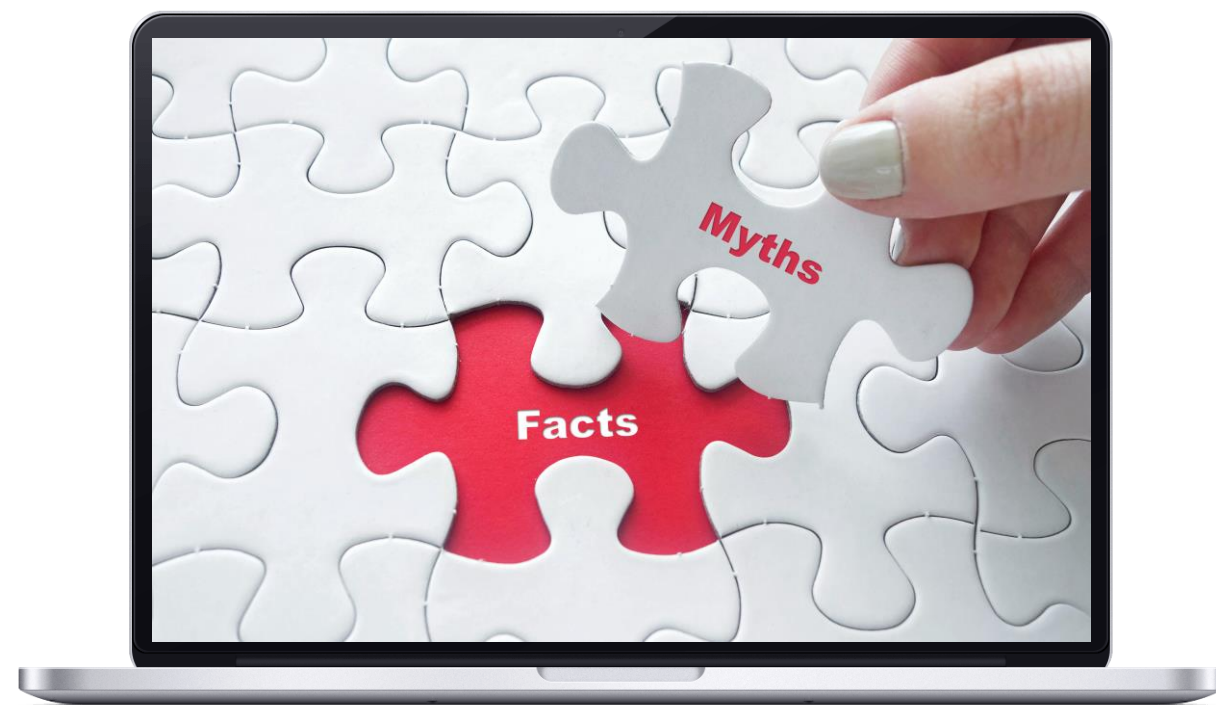
Immission – Today and Tomorrow

Optimization of Arrival and Departure – Minimization of Immission

Communication between Experts

Public Information

Objectification of Discussion

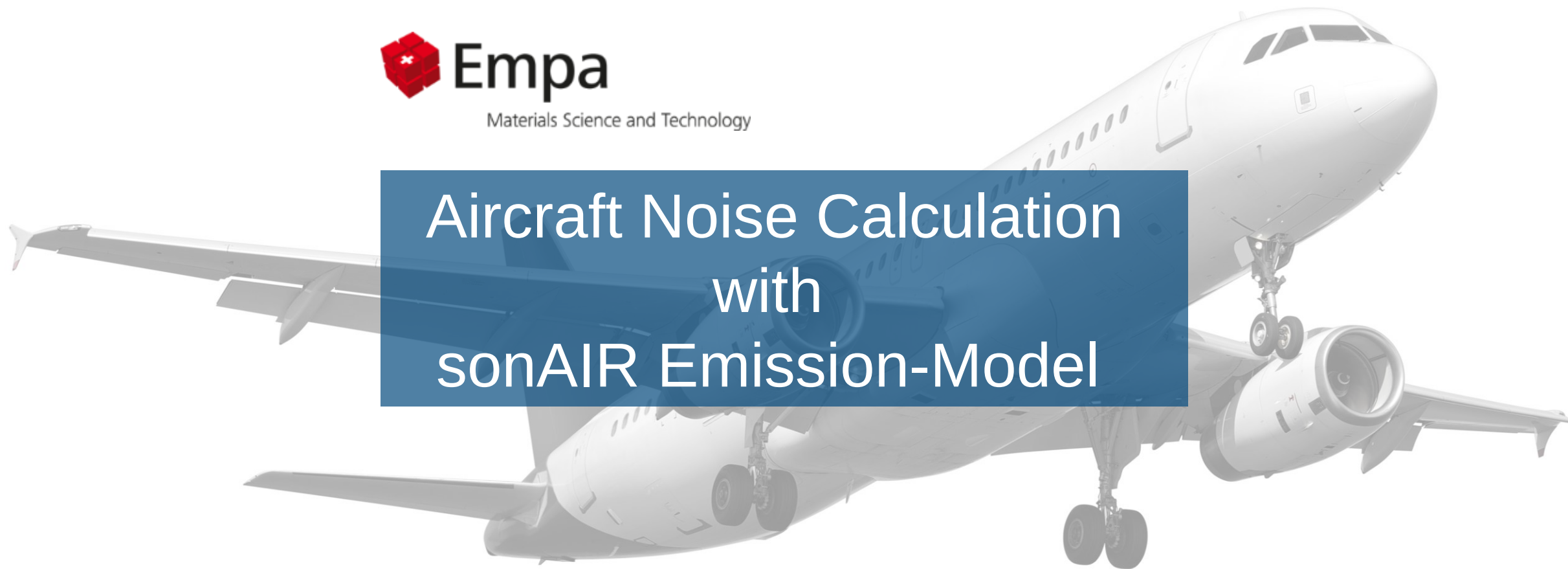




Empa

Materials Science and Technology

Aircraft Noise Calculation with sonAIR Emission-Model



Fans



Jets



Slats



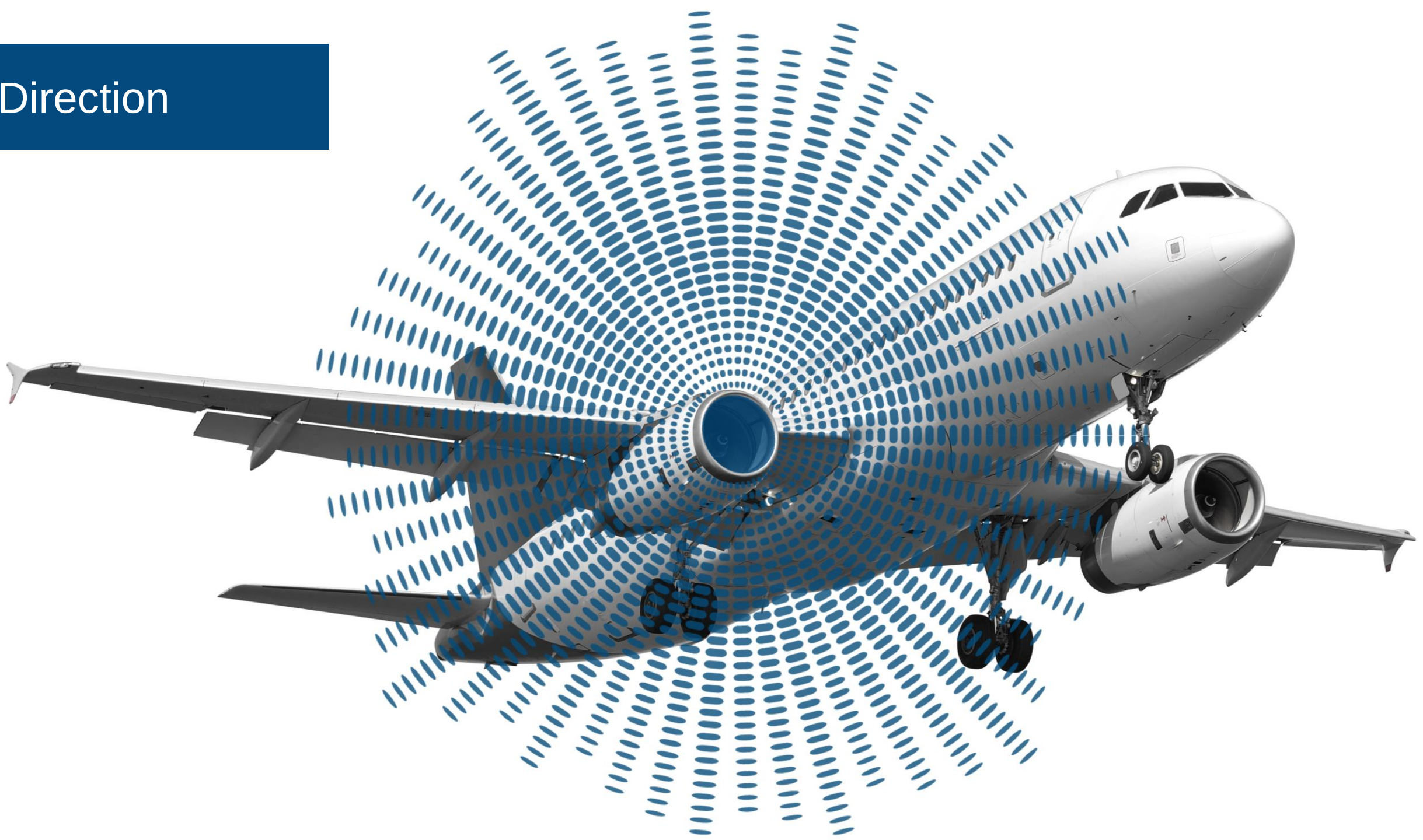
Flaps



Gear



Direction



Frequency Bands





Emissions

- Emission Model
- Source Information
Aircraft Type, Flight
Geometry Configuration

Sound Propagation

- Terrain



Sound Propagation

- Land Cover
- Natural Obstacles and Reflectors (Forest, Walls of Rock)



Sound Propagation

- Meteorology



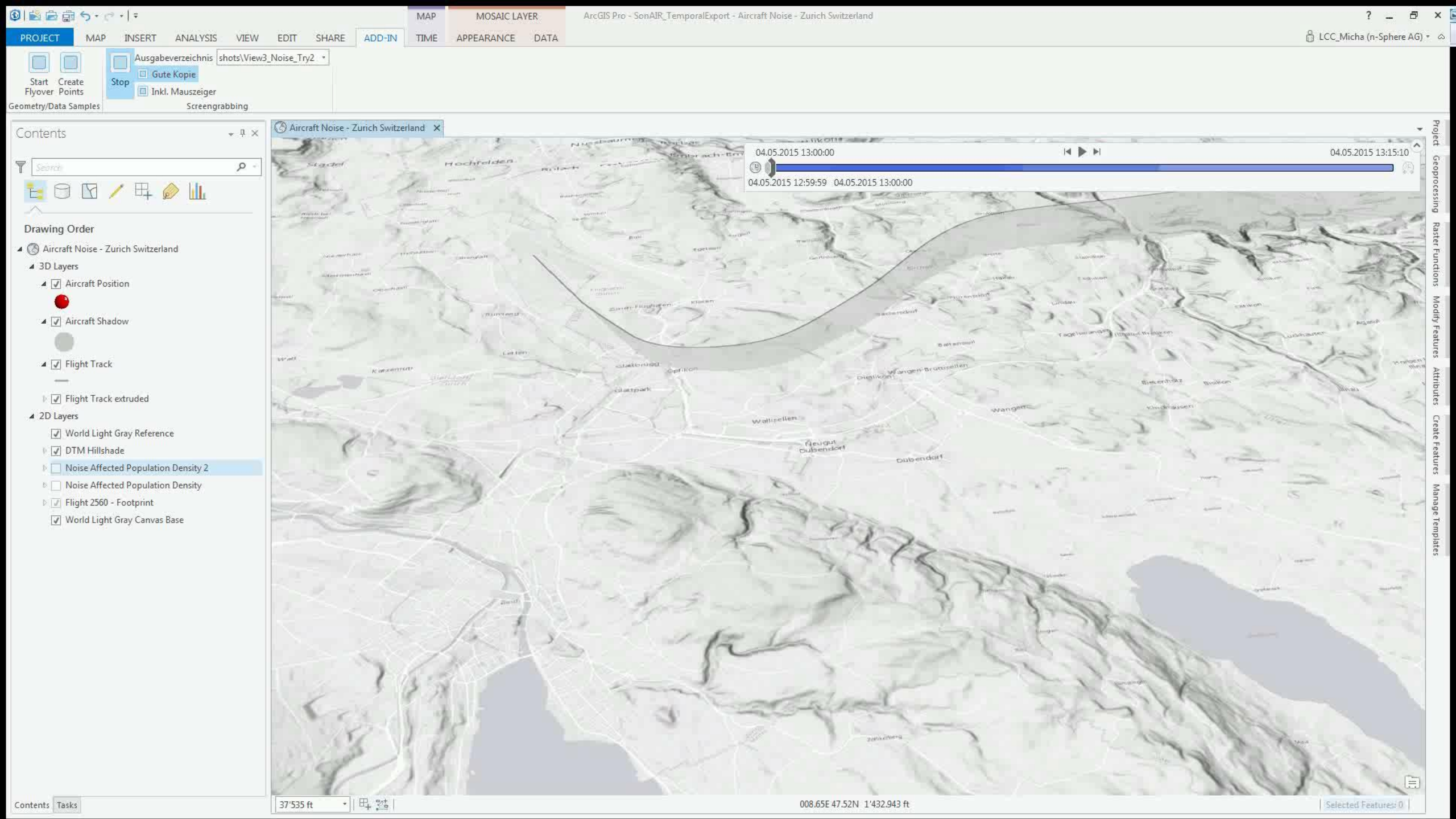
Sound Propagation

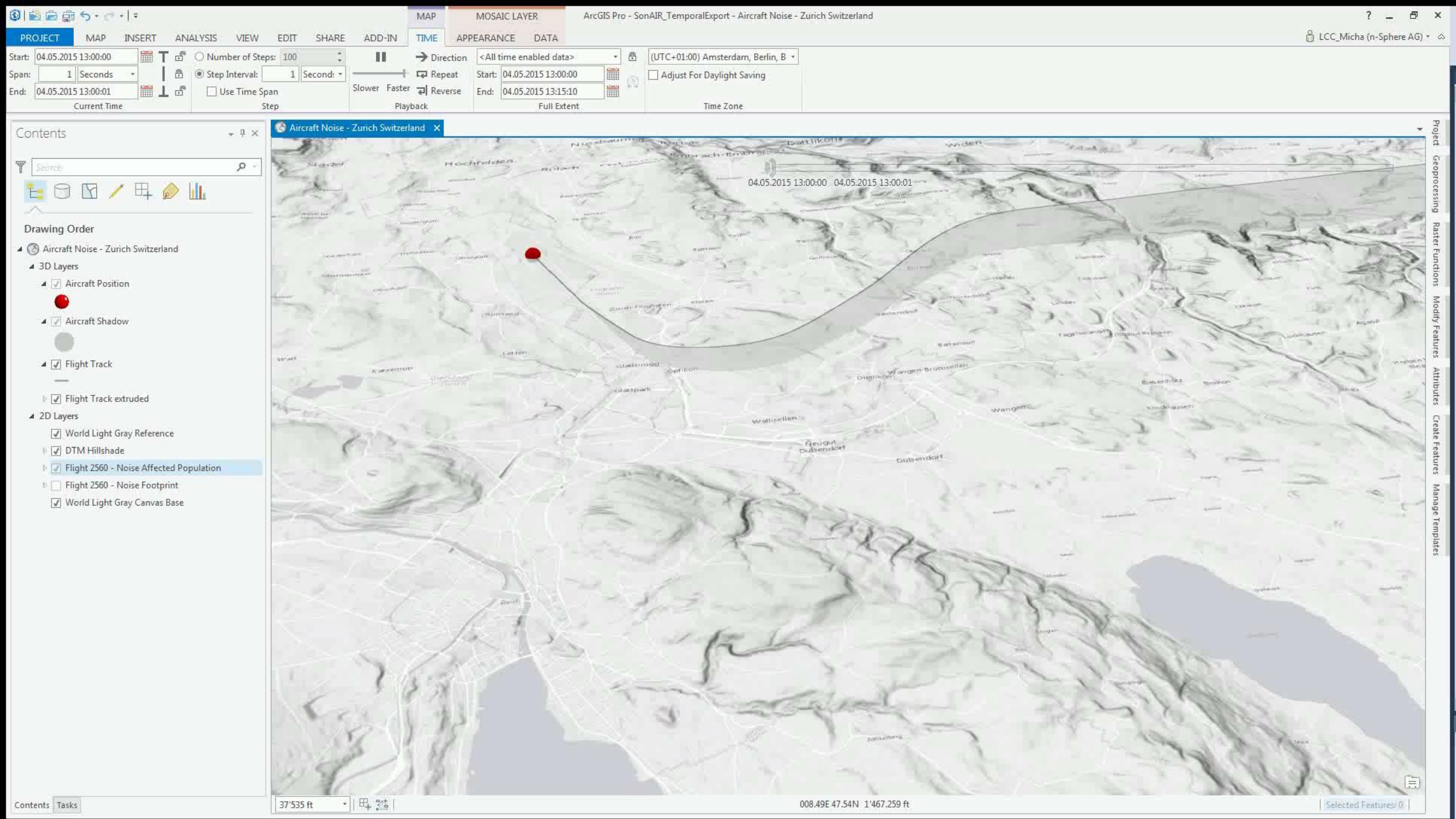
- Buildings

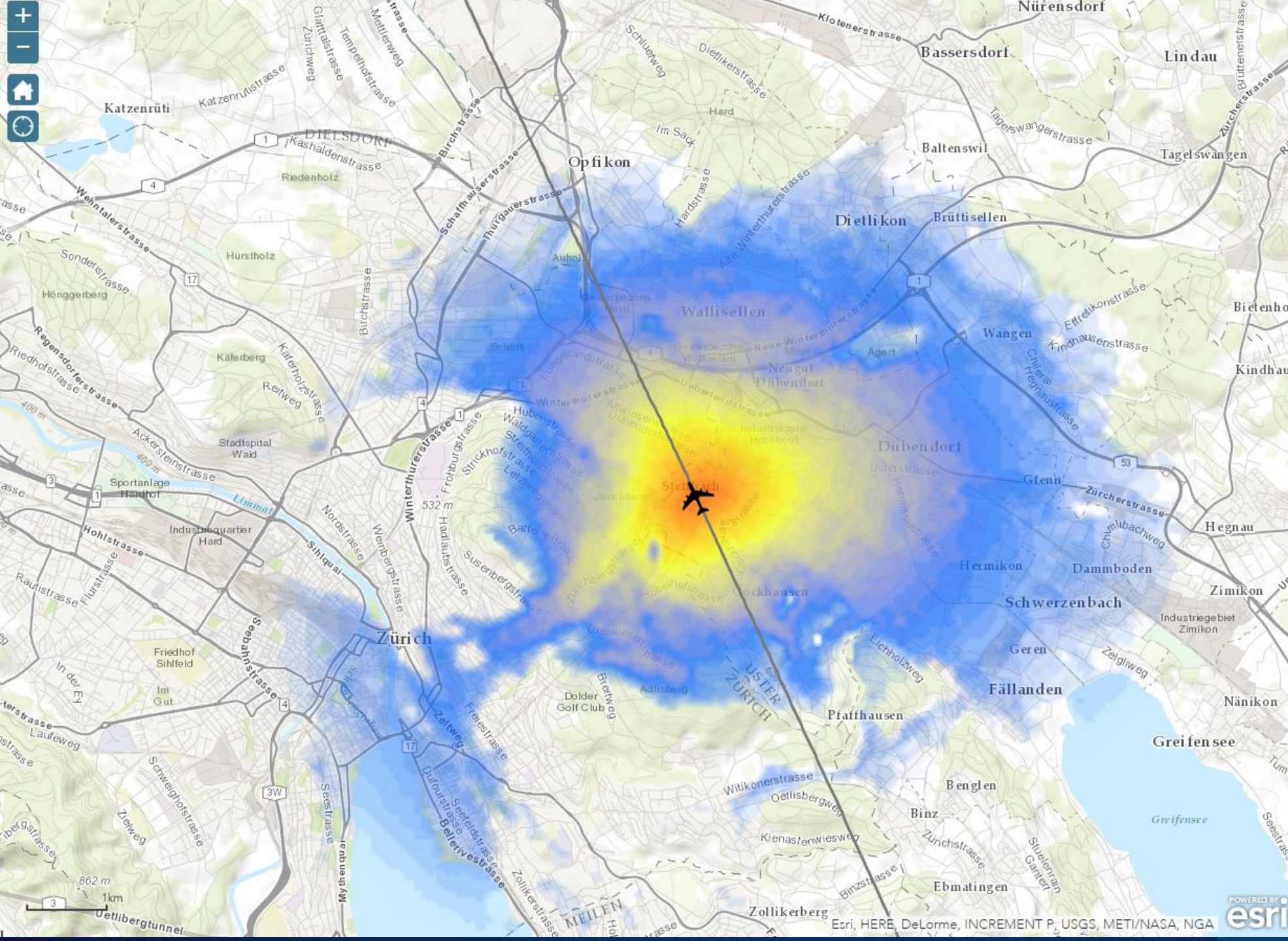
Receiver

- Receiver Position
- Population Data









Belastungsverlauf

Südanflug

Flugzeugtyp

Airbus A330 >

Route

Südanflug >

Variante

Variante 1 >

5x 07:25 / 10:22

282 km/h

Geschwindigkeit

51 %

Drehzahl N1

851 m

Höhe (absolut)

1.145 kg/m3

Dichte

8'477

Betroffene

110'598

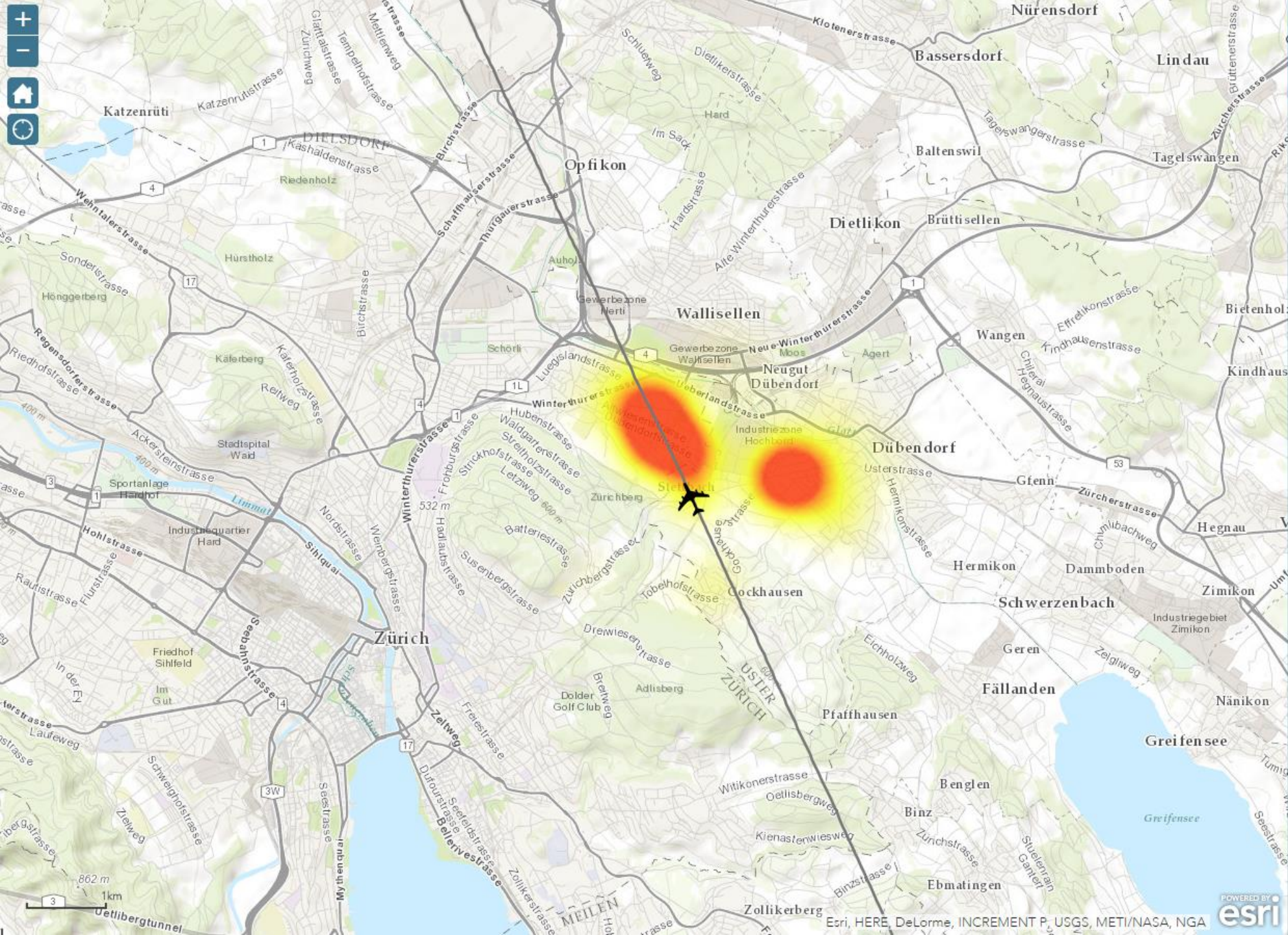
Betr. akumliert

Betroffene Bevölkerung

☐

Powered by **esri**

Esri, HERE, DeLorme, INCREMENT P, USGS, METI/NASA, NGA



Belastungsverlauf

Südanflug

Flugzeugtyp

Airbus A330 >

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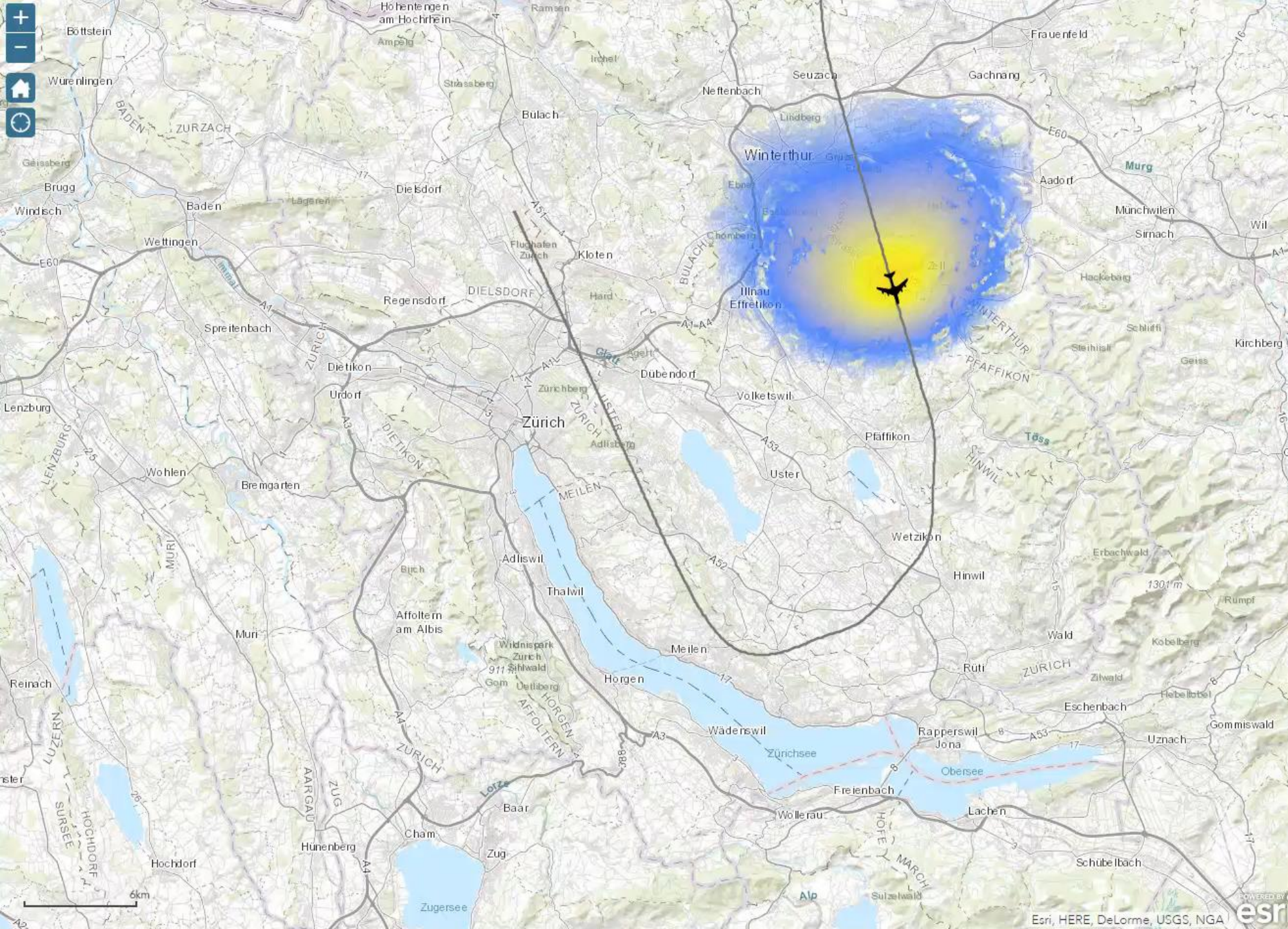
8'477

Betroffene

110'598

Betr. akumliert

Betroffene Bevölkerung



Belastungsverlauf

Südanflug

Flugzeugtyp

Airbus A330 >

Route

Südanflug >

Variante

Variante 1 >

10x 01:38 / 10:22

549 km/h

Geschwindigkeit

30 %

Drehzahl N1

2'816 m

Höhe (absolut)

0.921 kg/m3

Dichte

3'339

Betroffene

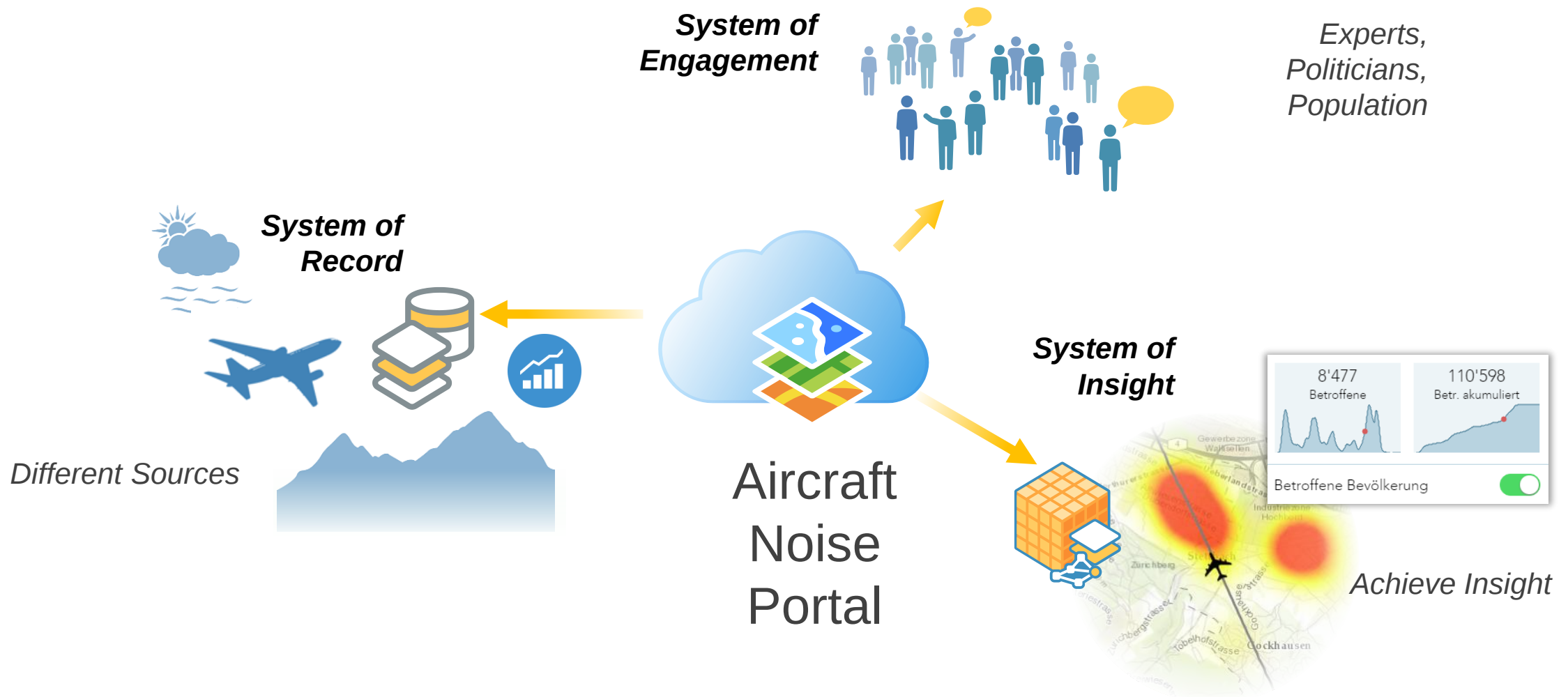
29'850

Betr. akumuliert

Betroffene Bevölkerung

☐

Fact based Discussion





Thank you