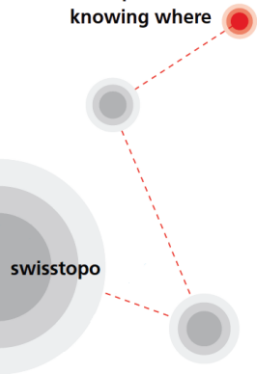




Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Eidgenössisches Departement für Verteidigung,
Bevölkerungsschutz und Sport VBS
Bundesamt für Landestopografie swisstopo
Direktion

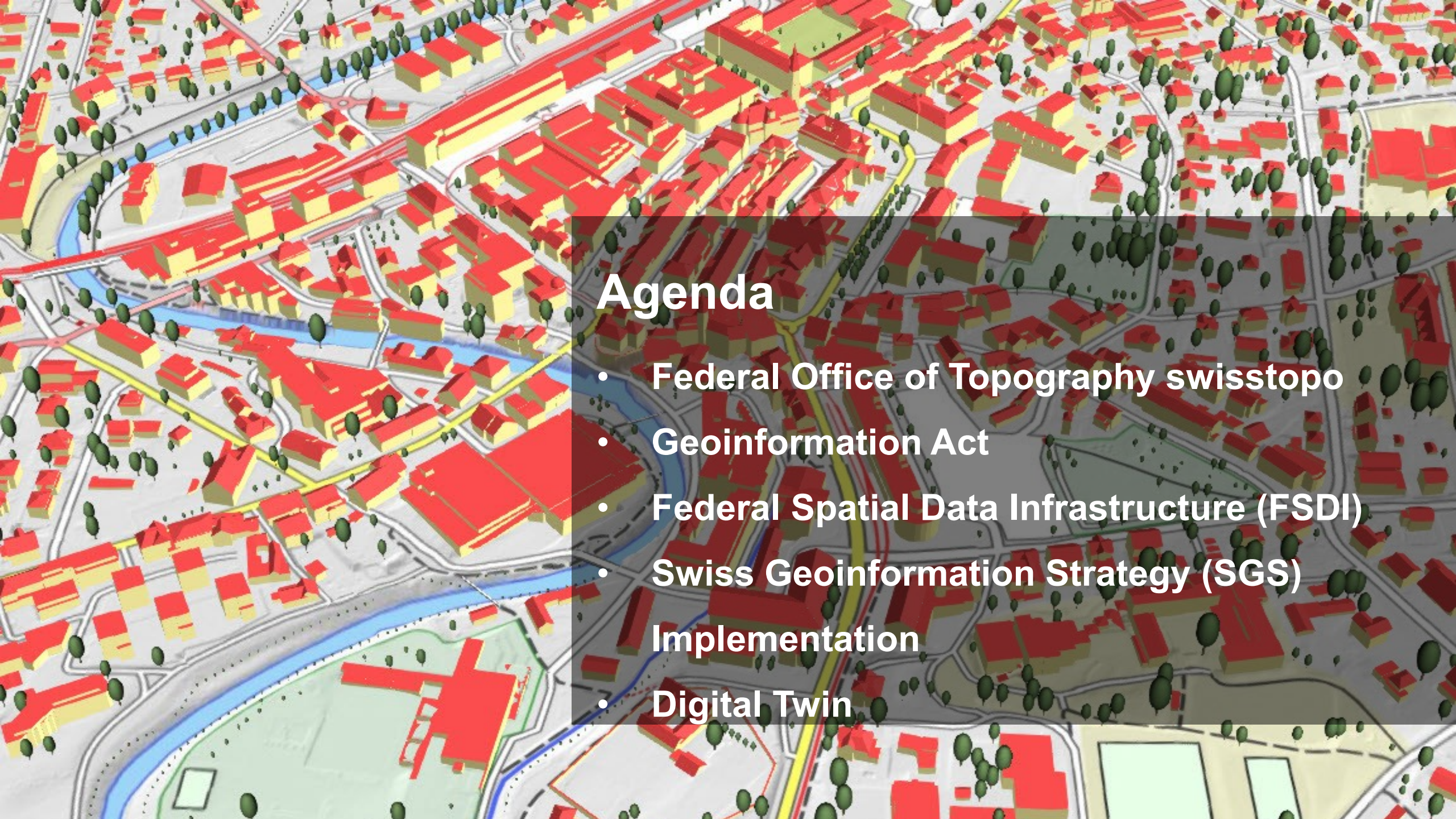
wissen wohin
savoir où
sapere dove
knowing where



Geoinformation @swisstopo

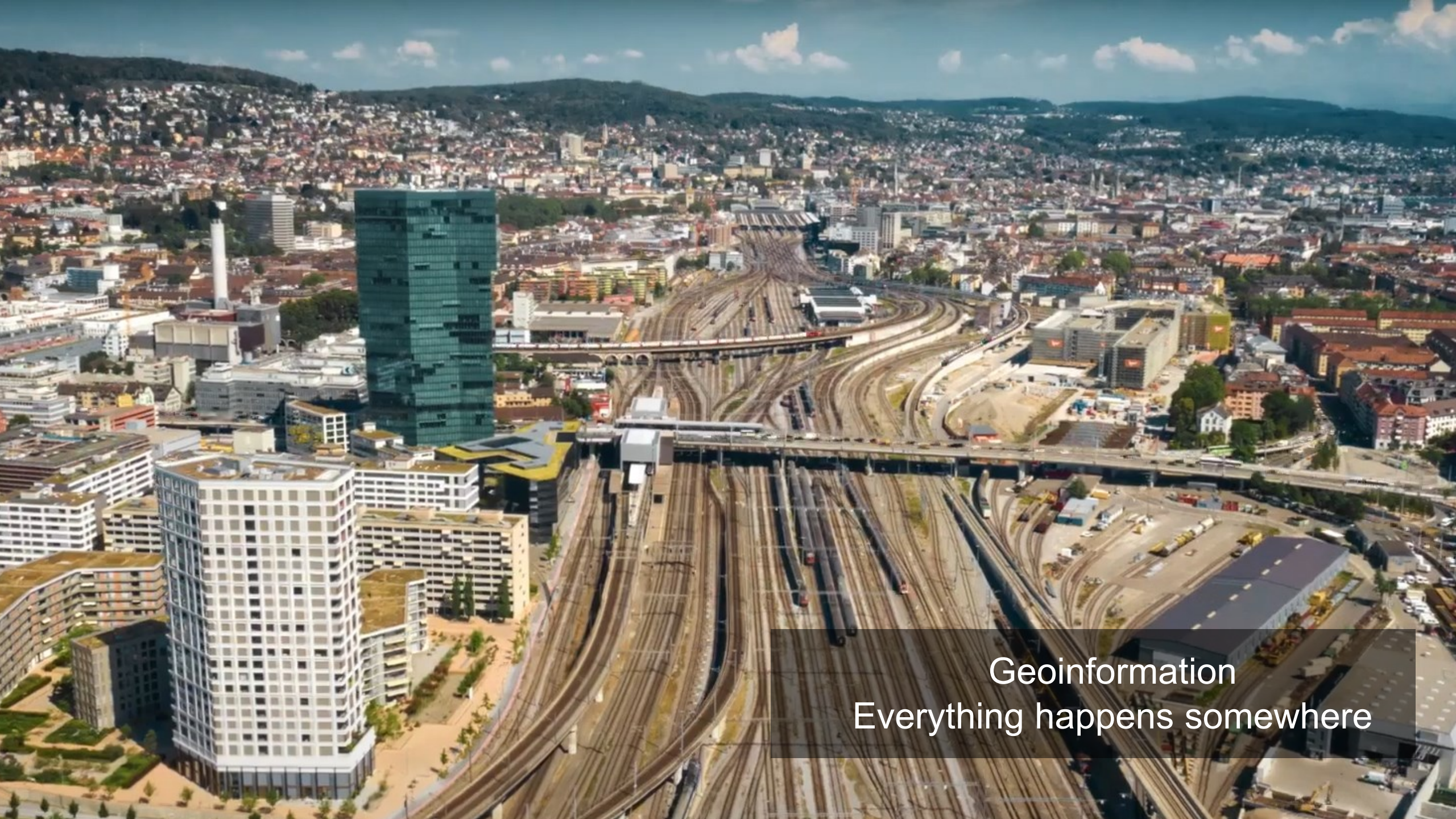
Dr. Christine Najar

14. November 2023

A detailed 3D digital model of a city, likely Zurich, Switzerland. The model features numerous buildings with red roofs and yellow walls, interspersed with green trees and a blue river. The perspective is from an elevated angle, showing the urban layout and infrastructure.

Agenda

- Federal Office of Topography swisstopo
- Geoinformation Act
- Federal Spatial Data Infrastructure (FSDI)
- Swiss Geoinformation Strategy (SGS)
- Implementation
- Digital Twin



Geoinformation
Everything happens somewhere



As Switzerland's geoinformation centre...

... we create the geodetic foundations of Switzerland and document the landscape and subsurface.

... produce high-quality products and make them easily available.

... we coordinate geoinformation and geology at federal level....

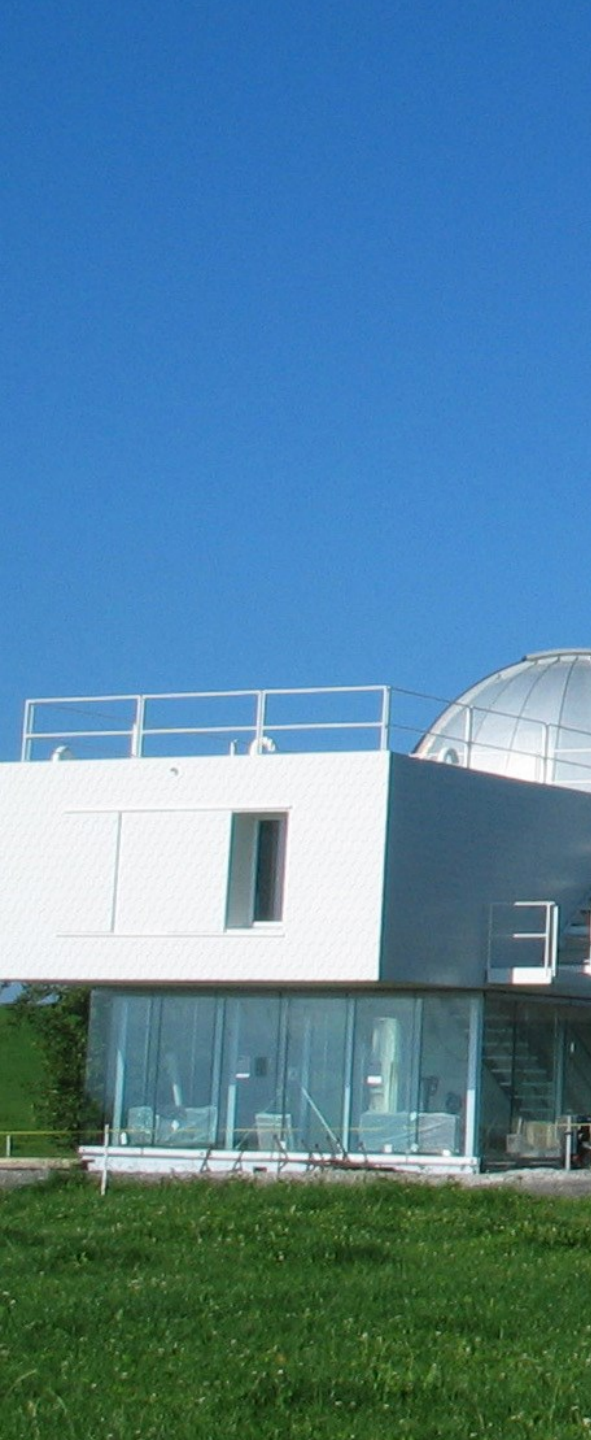
... and this since 1838!

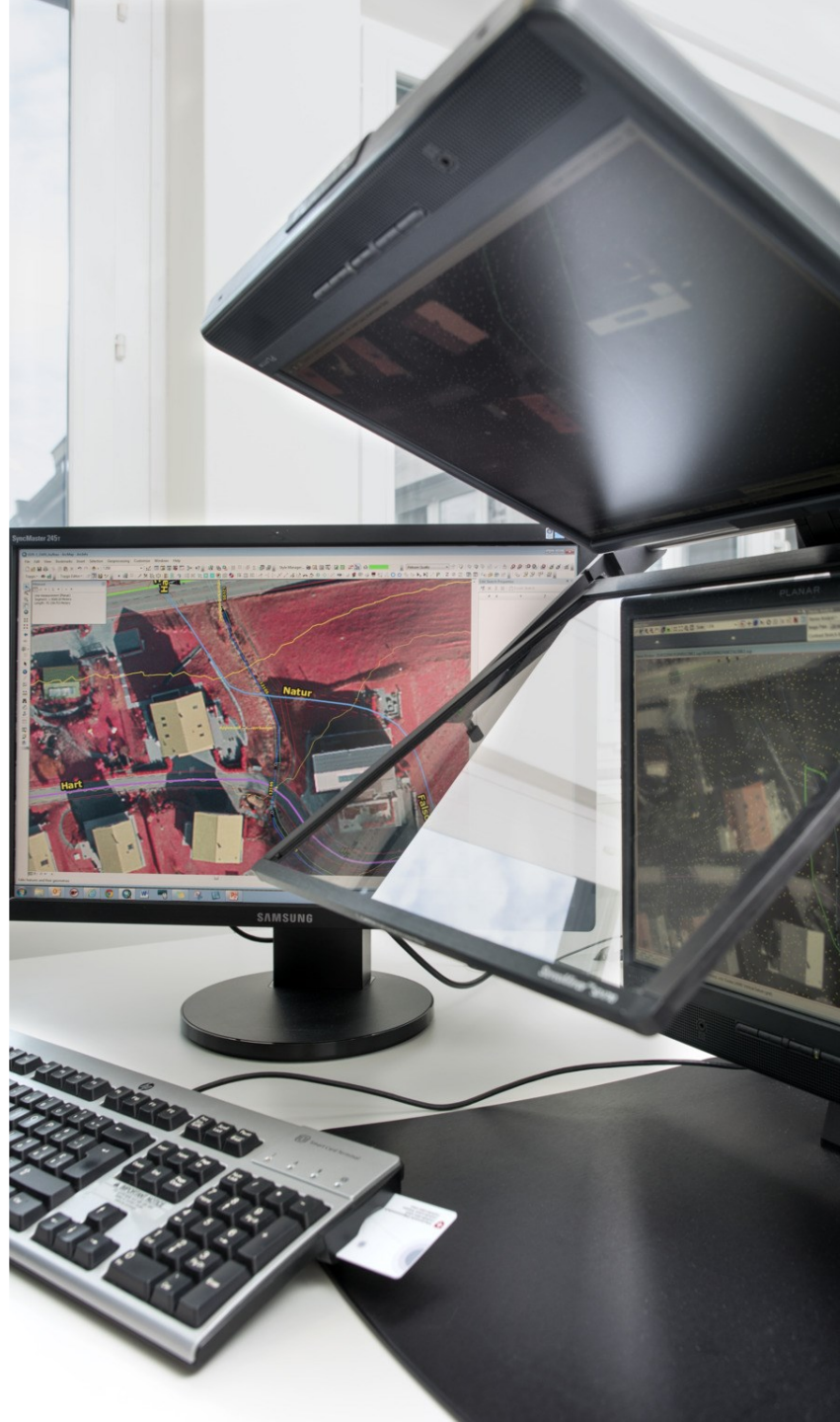
**400 employees, apprentices
and interns**

**Office belongs to the
Department of Defence, Civil
Protection and Sport**

**Wabern, Dübendorf,
St-Ursanne**



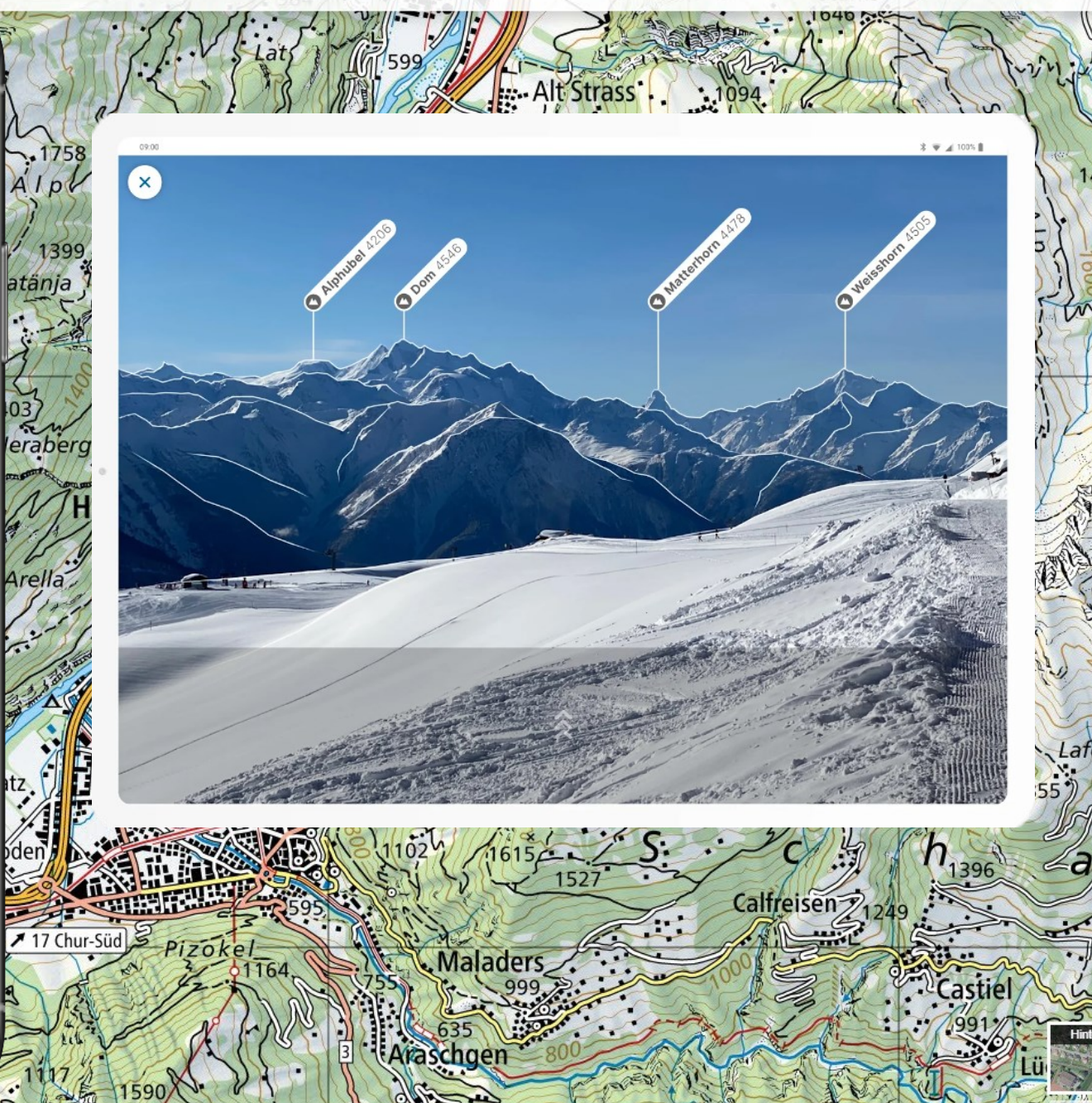
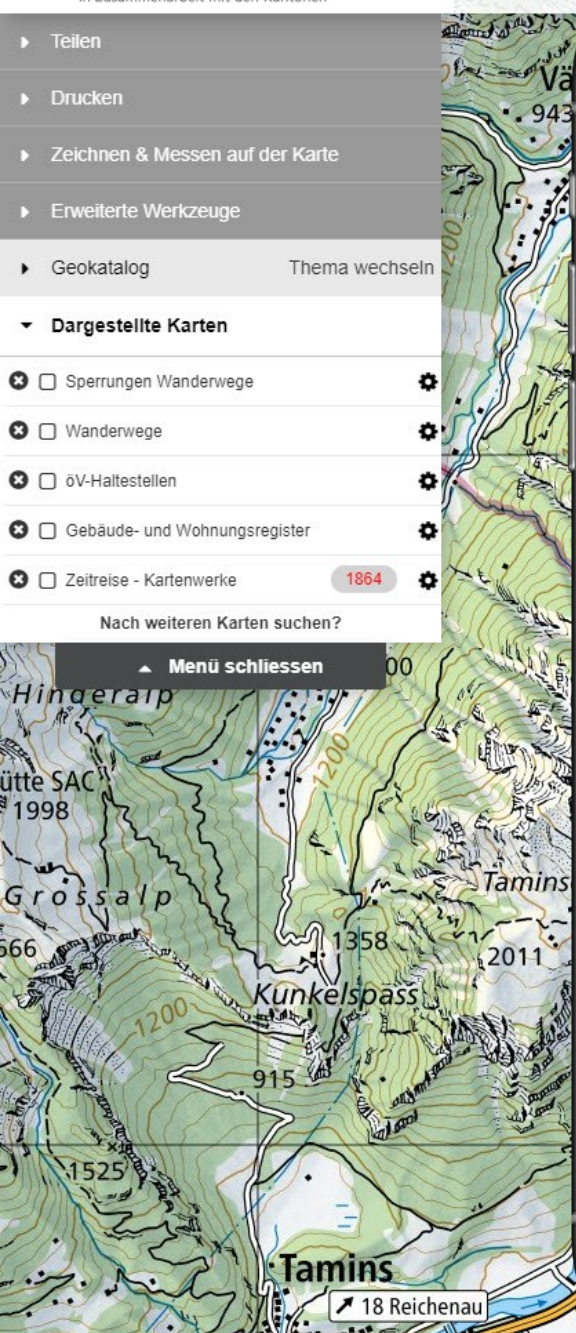
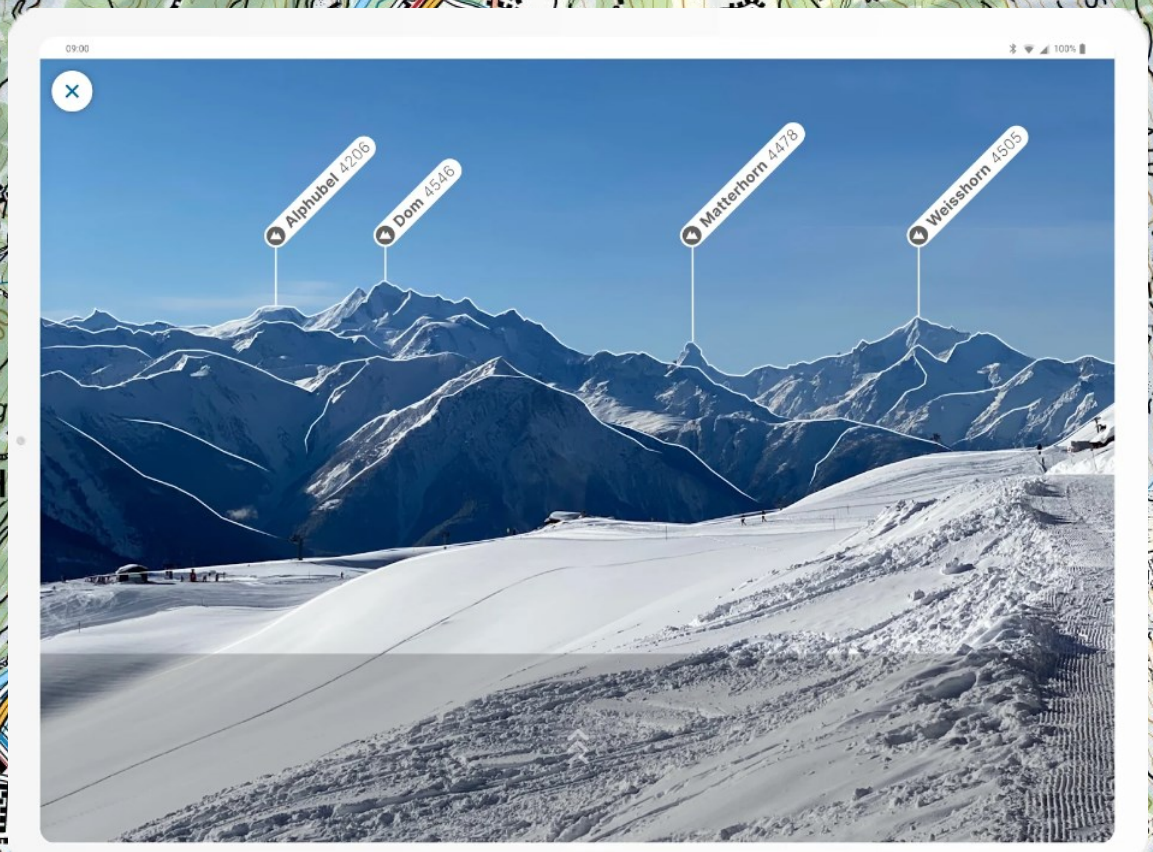




- Teilen
- Drucken
- Zeichnen & Messen auf der Karte
- Erweiterte Werkzeuge
- Geokatalog Thema wechseln
- Dargestellte Karten
 - ☐ Sperrungen Wanderwege
 - ☐ Wanderwege
 - ☐ öV-Haltestellen
 - ☐ Gebäude- und Wohnungsregister
 - ☐ Zeitreise - Kartenwerke 1864

Nach weiteren Karten suchen?

Menü schliessen



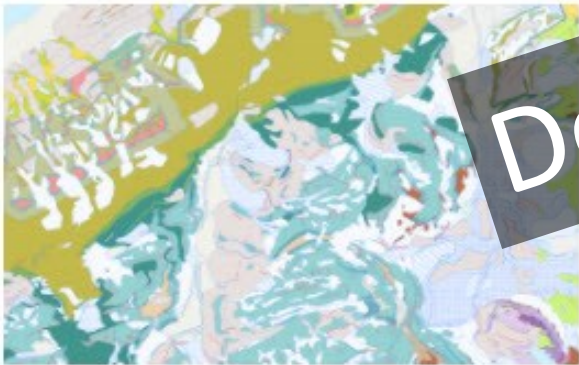


Geodaten und Applikationen



Digitale Karten

Die digitalen Karten von swisstopo gibt es im Raster- und Vektorformat. Sie bilden hervorragende Grundlagen für die digitale Nutzung und Weiterverarbeitung.



Geologische Geodaten

Geologische Karten vermitteln in Massstäben zwischen 1:25 000 und



Bilder

Bilder von swisstopo sind Momentaufnahmen der Landschaft, vom Boden, aus Flugzeugen oder Satelliten erstellt. Diese "Messbilder" ermöglichen geometrisch hochgenaue Weiterverarbeitungen.



Aeronautische Karten

Luftfahrtkarten der Schweiz mit

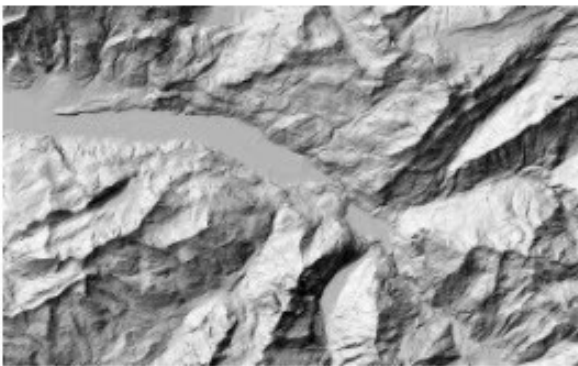


Landschaftsmodelle

Landschaftsmodelle geben die Objekte der Landschaft im flexiblen Vektorformat wieder. Sie bestehen aus thematischen Ebenen (Bsp. Verkehrsnetz). Jede Ebene umfasst georeferenzierte Punkt-, Linien-,...



Applikationen



Höhenmodelle

Höhenmodelle sind digitale Datensätze, welche die Form der Erdoberfläche in 3D beschreiben. Jedes Koordinatenpaar X und Y erhält eine Höhe Z. Verschiedene Produkte für unterschiedliche Ansprüche...



Geodienste

Download for free!



Since 2008 : Geoinformation Act

- **Geoinformation Act, Art. 1 Aim:**

This Act has the aim of ensuring that geodata relating to the territory of the Swiss Confederation is made available **for general use** to the authorities of the Confederation, the cantons and communes, the private sector, the public and to academic and scientific institutions in a **sustainable, up-to-date, rapid and easy manner, in the required quality and at a reasonable cost.**





Geoinformation Act

Legal basis for

- Definition of a **catalogue** of official geodata (Art.5)
- Creation of **conceptual models** for each geodata set (Art. 5).
- Description with **standardised metadata** (Art.6)
- **Offer portrayal and download services** (Art. 13).





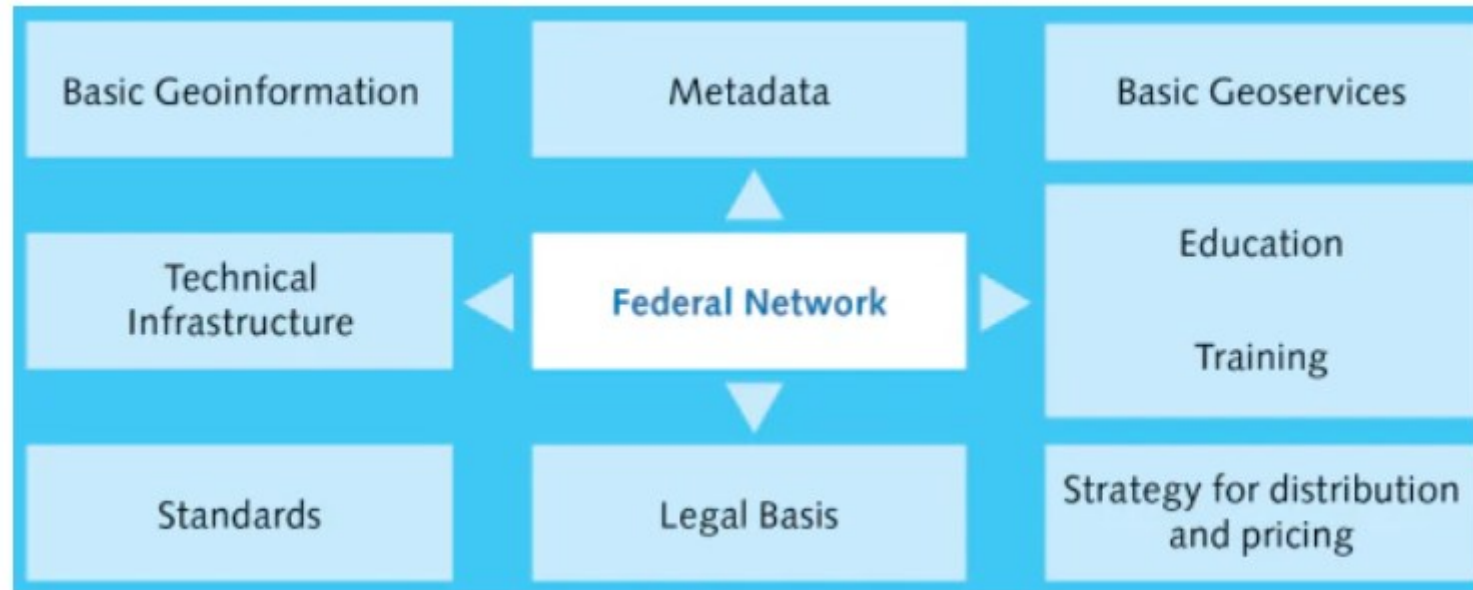
Status Quo Implementation

At the moment...

- 345 **minimal geodata models** (80%) were ratified and published on the model repository. (models.geo.admin.ch, INTERLIS Standard)
- 864 spatial data sets are **visualized** on map.geo.admin.
- 74% official data are provided as **download service**.
- 15'000 metadata of spatial data and services are searchable via the metadata application (geocat.ch).

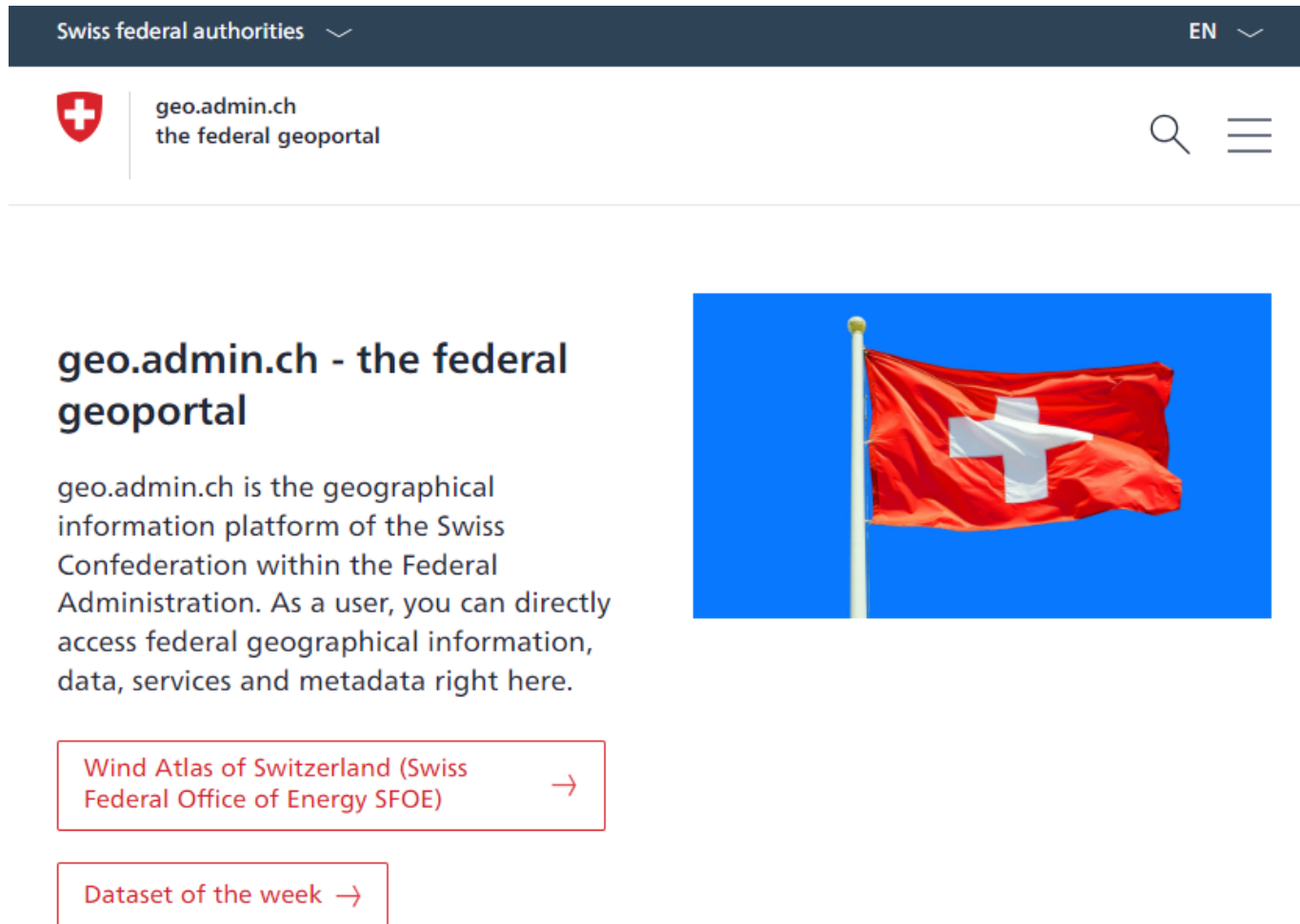


Federal Spatial Data Infrastructure 2001





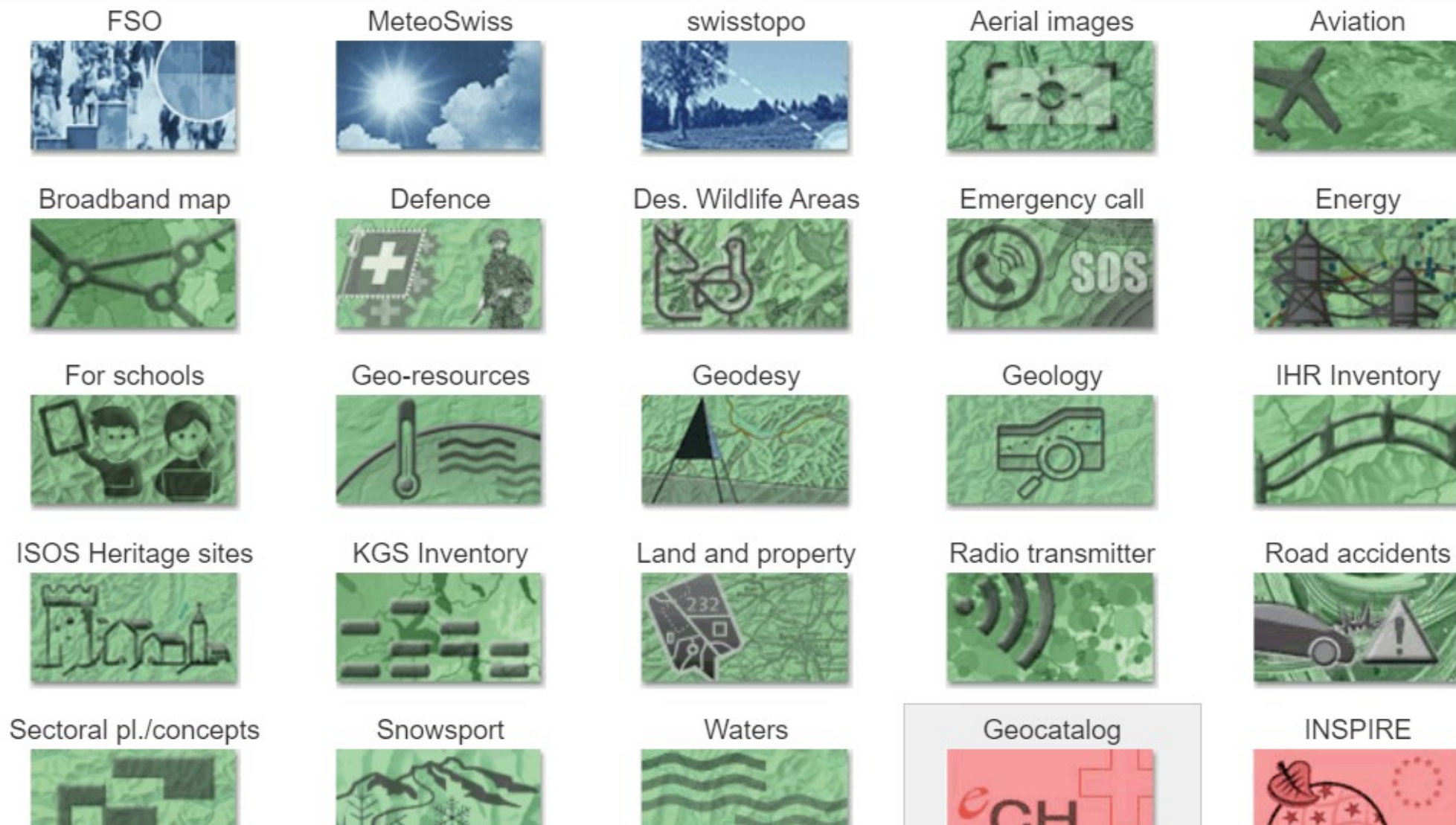
www.geo.admin.ch



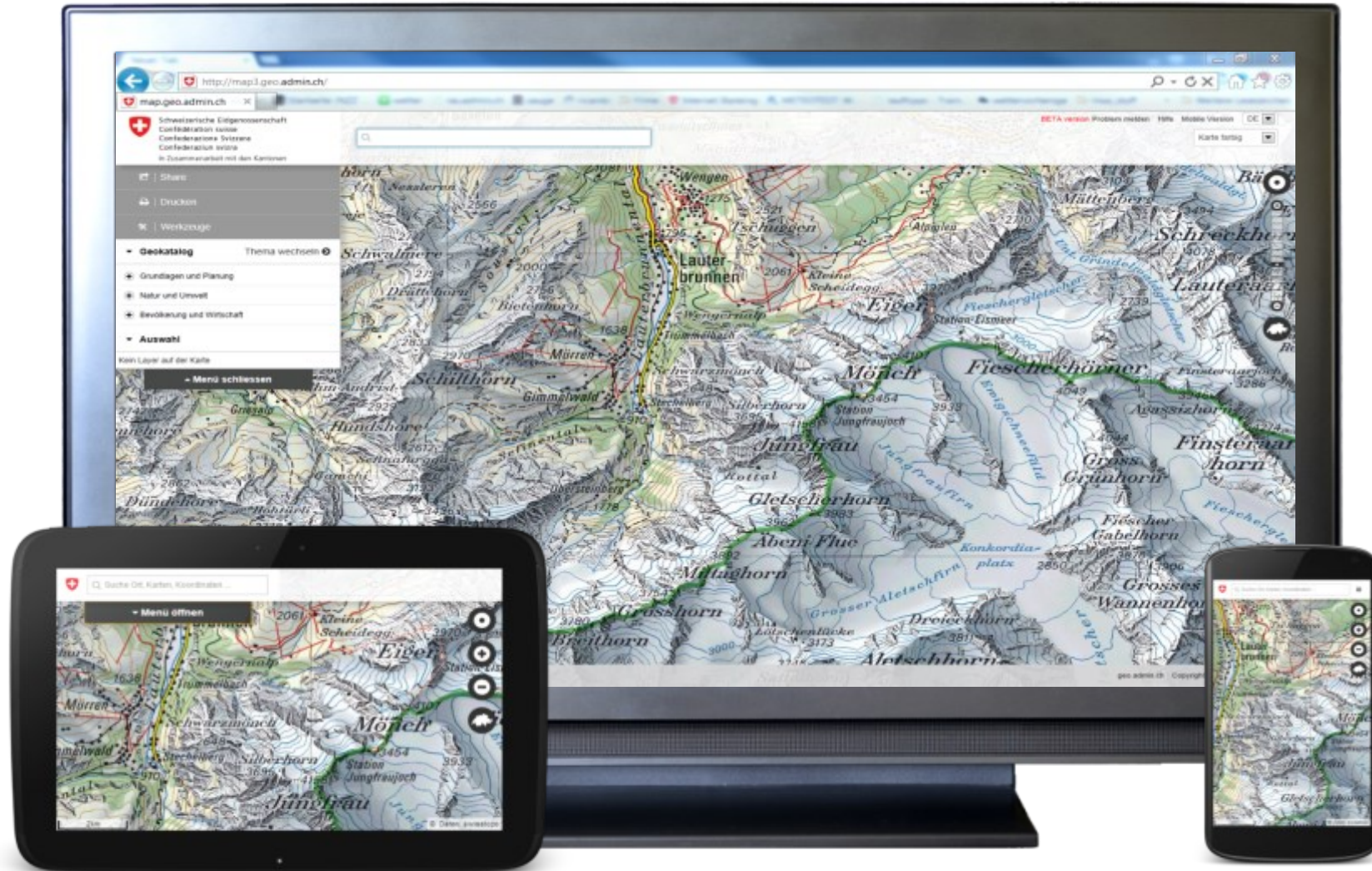
- Portal for geospatial data of the Swiss Confederation
- Access to the specialized network & community
- Cross-section project across federal authorities
- In collaboration with the Swiss cantons
- [Legal base: geoinformation act](#)
- Operated by swisstopo (Swiss NMA)



www.geo.admin.ch: geodata content, an example



Map Viewer: Desktop-Tablet-Smartphone



Aufbau nächste Generation map.geo.admin.ch
BETA Viewer: <https://test.map.geo.admin.ch>



Awards

12 Prizes

www.geo.admin.ch

map.geo.admin.ch

data.geo.admin.ch

api.geo.admin.ch

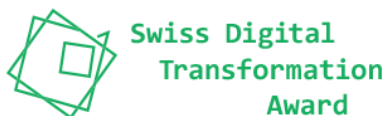
info@geo.admin.ch / [@swiss_geoportal](https://twitter.com/swiss_geoportal)



UNITED NATIONS



NATIONS UNIES





Services on geo.admin.ch

geo.admin.ch offers a suite of geo-webservices on an Open Government Data base:

- Portrayal services (e.g. WMS, WMTS, Vectortile-service)
- Catalog service (geocat.ch for geographic metadata)
- Data model repository
- Download services (filebased and API (STAC – spatio temporal asset catalog))
- A mapviewer API (with several REST services such as Search, Height, Profile services)
- The mapviewer itself: <https://map.geo.admin.ch>

Map Viewer: 3D Data



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra
In collaboration with the cantons

Search for a place or add a map:

[Try out test.map.geo.admin.ch](#) [Full screen](#) [Report problem](#) [Help](#) [Mobile version](#) [DE](#) [FR](#) [IT](#) [EN](#) [RM](#)

► Share

► Advanced tools

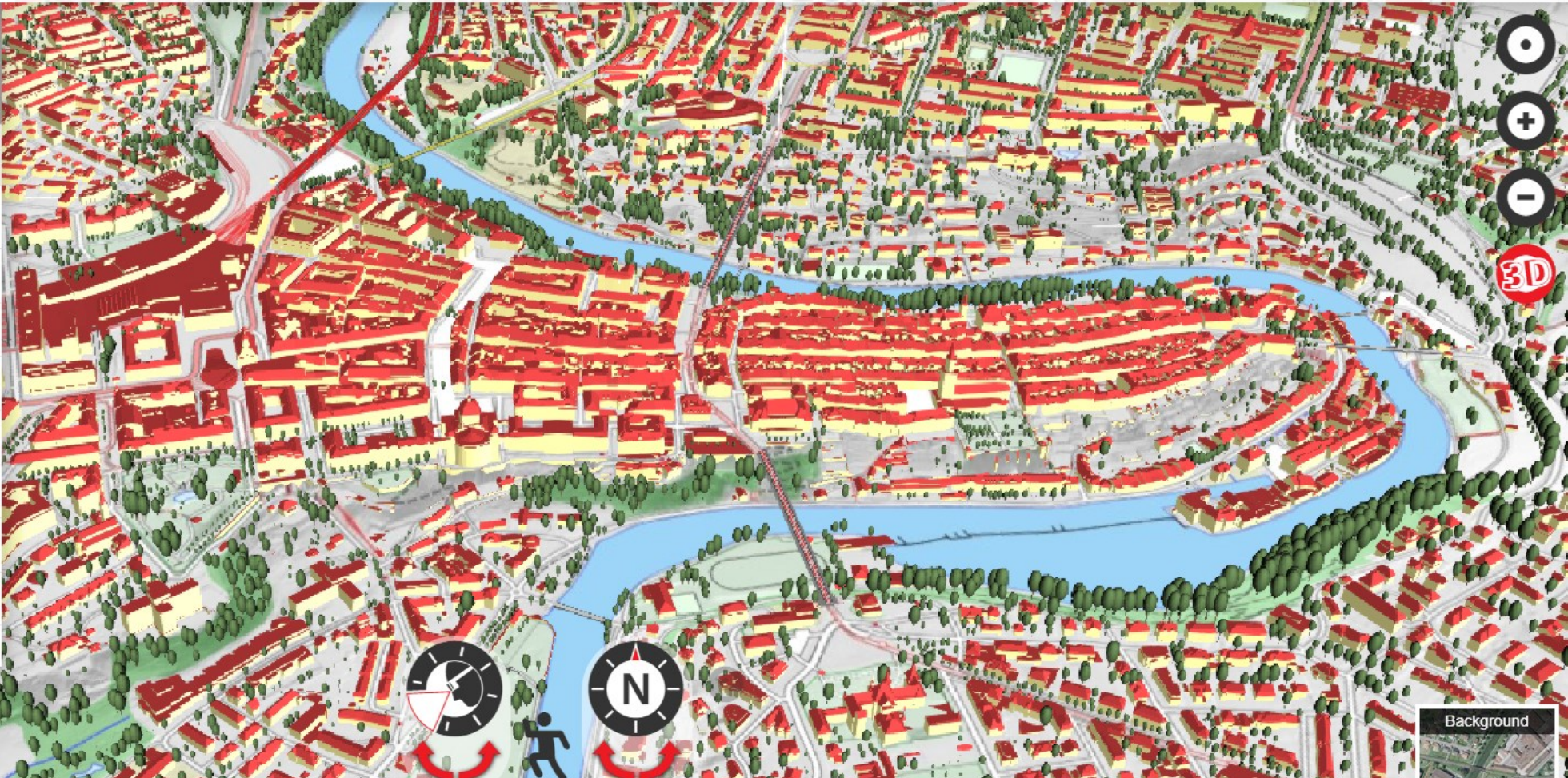
► Geocatalog [Change topic](#)

▼ Maps displayed

- ☒ Geographical Names swissNAMES3D
- ☐ Forest swissTLM3D
- ☐ Closures Hiking trails
- ☐ Hiking trails
- ☐ Public transport stops
- ☐ RBD: building status
- ☐ Journey through time - Maps 1864

[Looking for more maps?](#)

▲ Close menu



Navigation controls: compass, zoom in (+), zoom out (-), 3D toggle, and a person icon for street view.

geo.admin.ch: Usage

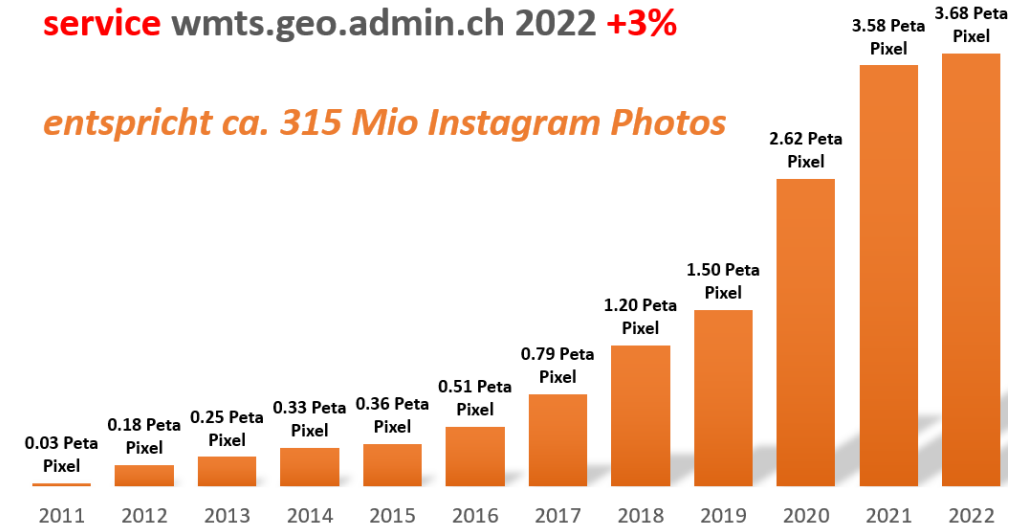
visits map.geo.admin.ch 2022 **-4%**

Entspricht ca. 52 "visits" pro Min 24/7

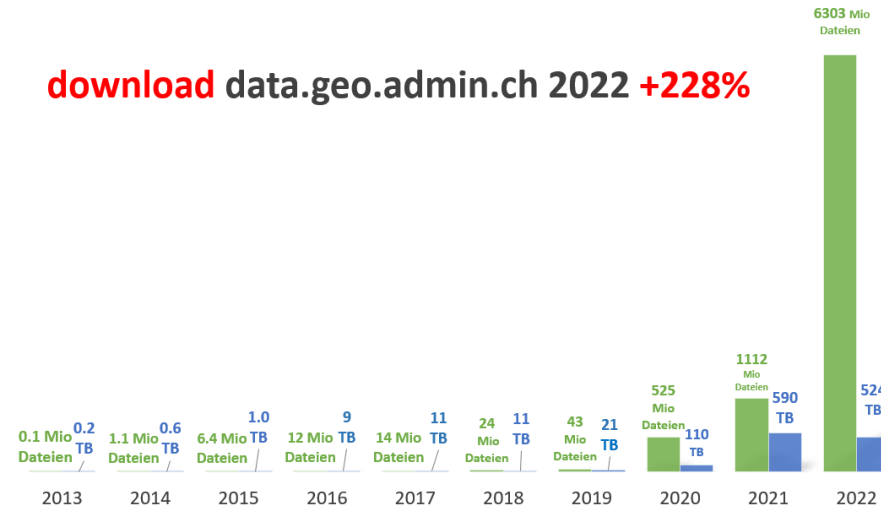


service wmts.geo.admin.ch 2022 **+3%**

entspricht ca. 315 Mio Instagram Photos



download data.geo.admin.ch 2022 **+228%**



Facts & Figures – Swiss Geospatial Infrastructure

Timeline

2001 1st Swiss Geoinformation Strategy

2003 Implementation Concept

2007 Federal Act on Geoinformation

2008 Geospatial Infrastructure www.geo.admin.ch

2016 Linked Data

2018

- 2018 Mandate in «Aktionsplan Digital Schweiz»
- **Mandate by Federal Council** («Eckwerte für eine Datenpolitik der Schweiz» 9th May, 2018 : Lead swisstopo, time frame: Q4-2020)

2020 New Geoinformation Strategy including Digital Twins approved by Federal Council and Swiss Conference of Directors of Construction, Planning and Envi.

2021 Implementation Concept



Paradigm Shift

- From Data to **Information** and **Knowledge**
- From Data Producers to **Integrators**
- From few Stakeholders to **many**
- From linear Processes to **Interaction**
- From Ownership to **Use**

2017

Expert

Manual/
Bespoke

Authoritative

Corporate
Systems

Supplier
Push

Description

Post
Analysis

2D/Static

Narrow

Quality
Descriptors

Non-Expert

Automated/
Integrated

Diverse

Mobile
Devices

Consumer
Pull

Prediction

Real-time

3D/4D/
Dynamic

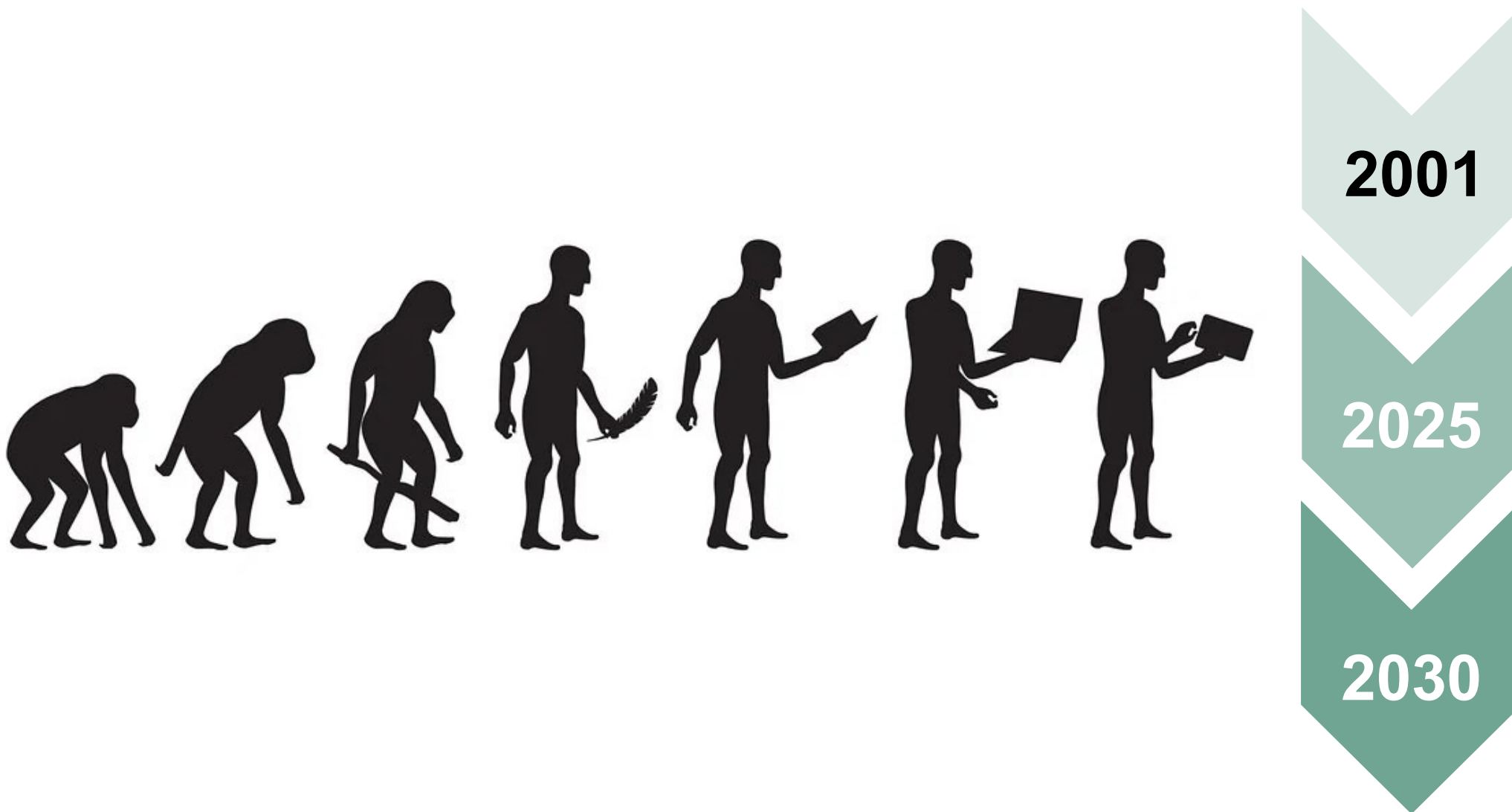
Broad

Warrantability

2022

<http://www.crcsi.com.au/spatial-knowledge-infrastructure-white-paper/>

The Evolution of the Swiss Geoinformation Strategy



NGDI 1.0
2020

Strategy Implementation →

NGDI 3.0
2030

Data Infrastructure + Portals



Data Provision



Data Harmonisation



Standardisation



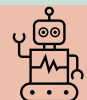
Develop Ecosystem Geoinformation

1



Build Competences

6



Use Geodata Science

4



Make Innovation possible

5



Process und Interface

3



Interoperability, Linking

2



Linked Platforms

7

Geo-Knowledge-Infrastructure

Organisations Involved in Implementation

EPFL



Universities

 Digitale Verwaltung Schweiz
Administration numérique suisse
Amministrazione digitale Svizzera

 **eCH**



LERNETZ

Associations



 Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

 BPUK DTAP DCPA

 **GKG**

**KGK
CGC**



26 Cantons

Schweizerischer Städteverband
Union des villes suisses
Unione delle città svizzere



Cities

Action Plan 2023

Strategie
Stratégie

Roadmap-Teilziele
*Feuille de route,
obj. partiels*

AP: Massnahmen
PA: mesures

De:
[2d6cbec5-2f08-4ec5-b790-df8c59977bfa.pdf \(admin.ch\)](#)

Frz:
[55d0ceaf-f056-430c-b9c2-93a326e0f8c1.pdf \(admin.ch\)](#)



Aktionsplan 2023



Genehmigt durch das SGS-Board

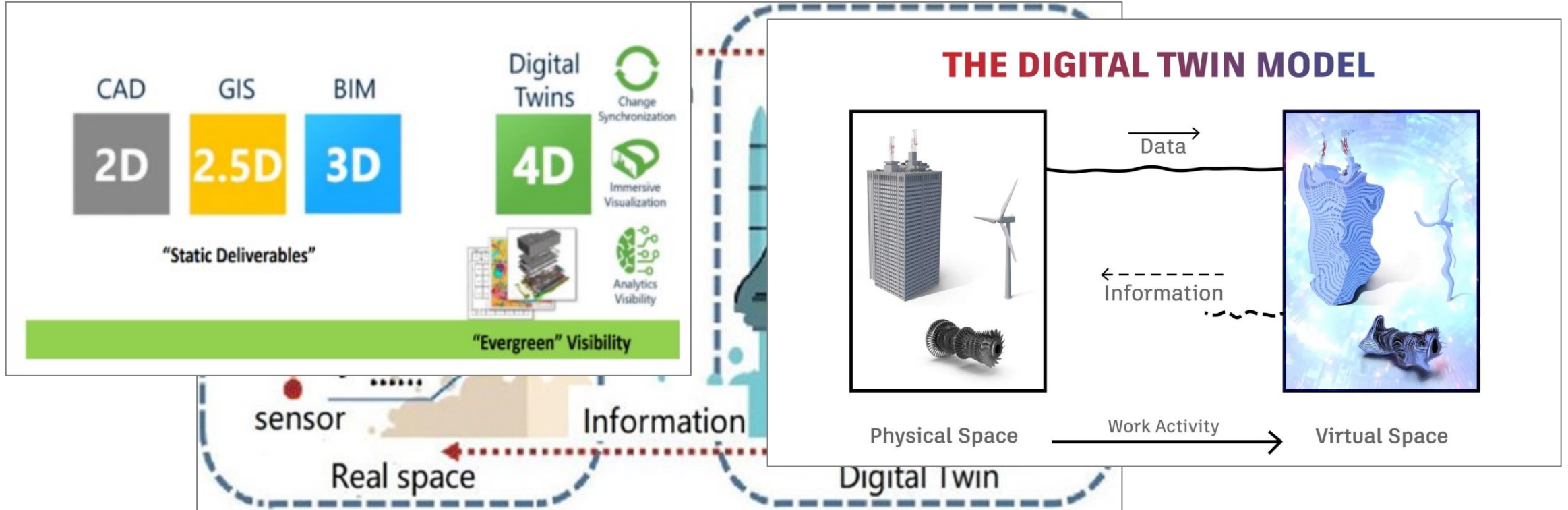
(GKG am 16.12.2022, KGK-Vorstand am 22.12.2022)

I.	Einleitung.....	2
II.	Roadmap-Teilziele.....	2
III.	Betriebsaufgaben und Partnerprojekte	4
IV.	Aktionsplan 2023.....	5
	Aktionsfeld 1: Ökosystem Geoinformation fördern	5
	Aktionsfeld 2: Geodaten verknüpfen	6
	Aktionsfeld 3: Prozesse erleichtern	7
	Aktionsfeld 4: Geodata Science entwickeln	8
	Aktionsfeld 5: Innovation fördern	9
	Aktionsfeld 6: Kompetenzen aufbauen und stärken	9
	Aktionsfeld 7: Digitale Plattformen weiterentwickeln	10



What is a Digital Twin?

Different Definitions





Digital Twin

29

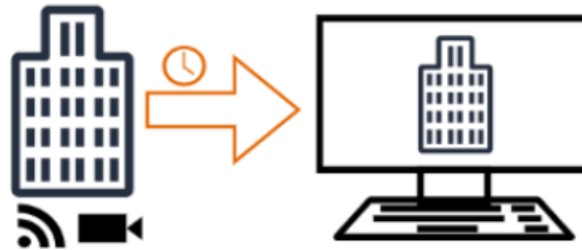
Digital Model

Virtual reflects physical



Digital Shadow

Virtual reflects physical realtime



Digital Twin

Bi-directional data flows

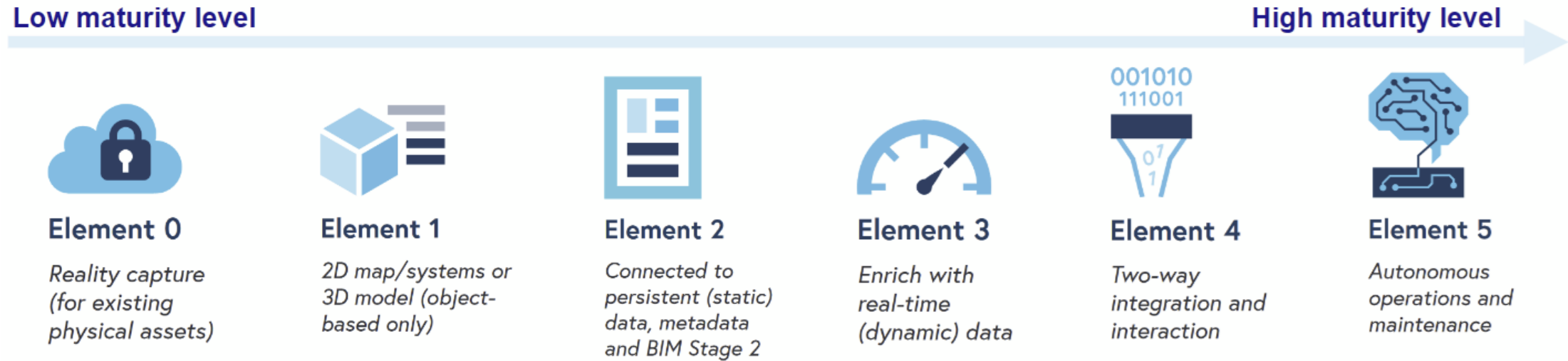




Maturity framework

30

- General framework to assess Digital twin maturity



References :

[Evans et al.
2019](#)





- 40 Teilnehmende (Bundes-, Gemeinde- und kantonale Ebene)
 - Ziemlich technisch
 - Gute Teilnahmequote, vielen Dank!
 - Öffentliche Ergebnisse
-
- *40 répondants (niveau fédéral, cantonal + municipal)*
 - *Assez technique*
 - *Bon taux de participation, Merci !*
 - *Résultats publics*





Thank you

Organisation SGS

Steuerung strategisch
Contrôle stratégique

SGS Board
GKG, VS KKG

Aktionsplan

Steuerung operativ
Contrôle opérationnel

SGS Management
Vertreter GKG, KKG, SSV

«Backlog»
Finanzierung

Koordination,
Kommunikation,
Realisierungen

SGS Office
Mitarbeitende KOGIS / KKG

Prozesse

Aktionsfelder
Champs d'action

«Aktionsgruppen» /
Projekte
Individuell pro Aktionsfeld

Aktionen / Projekte