



CASE STUDY

ZugTwin: Setting out for the third dimension

Canton of Zug | *Switzerland*



Industry

- Government & Public Sector

Solutions

- WebGIS, Terramapserver, DaaS

Challenges

- Limited use of existing data
- Lack of realistic 3D model
- Need for digital foundation to support digital strategy

Results

- ZugTwin: Publicly accessible 3D digital twin
- Self-service access to geodata
- Data can be downloaded directly or as a geoservice

Located in the heart of Switzerland, the **Canton of Zug** is one of the country's most economically powerful regions and is internationally established as a major financial and trading center. This positive economic development is based on modern infrastructure and a high quality of life. The Canton purposefully promotes innovation and entrepreneurship, reflected by a large number of startups and technology companies. This innovative strength and a consistent digital strategy support diversification and sustainable stability of the regional economy.

With its "Digital Zug" strategy, the Canton pursues ambitious goals for further digitalization of administration and the development of contemporary services. The focus is on innovative approaches that drive digital transformation and create long-term value. Through ZugMap, the Canton's publicly accessible geoportal, users gain access to extensive geoinformation. While this data was previously only available in 2D, the partnership with Octave and the use of cutting-edge technologies have enabled access to a digital 3D twin of the Canton of Zug since May 2025: ZugTwin.

First-class service through digital transformation

When implementing its digital strategy, the Canton of Zug acts as a fast follower, yet pioneers in selected topics. Technical innovations are not developed in-house; instead, the Canton quickly adopts and adapts established technologies to fit its own needs, integrating them into its services and organization.

To be prepared for the future and enable 3D planning of projects, the Canton wanted to use existing data resources, enriched and transformed into a realistic digital 3D model of the canton that provides valuable additional information. The goal was to create a foundation for promising new applications, such as a platform for data-driven planning processes or the simulation of natural events.

For Markus Hess, head of the Office for Land Register and Geoinformation of the Canton of Zug, one thing is clear: "We assume that many administrative activities can greatly benefit from 3D applications and that working with 3D information will become even more important in the future."

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Head of the Office for Land Register and Geoinformation
Canton of Zug,
Switzerland

As part of the "Digital Twin Canton of Zug" or "ZugTwin" project, the Canton worked with the Lucerne University of Applied Sciences and Arts and Octave. A special focus was placed on the collaborative and technical interface of digital twins with augmented reality and interactive data tables for integrated urban on-site and online services. With this expanded set of methods, new communication formats were created to promote awareness and participation in the Canton's data and work.

Upgrading geoinformation from 2D to 3D

The trans- and interdisciplinary collaboration among the leading Office for Land Register and Geoinformation, the Office for Monument Preservation and Archaeology, the Office for the Environment, Octave in Switzerland and Lucerne University of Applied Sciences and Arts formed the foundation for realizing the ZugTwin project.

ZugMap, the existing public geoportal, was chosen as the basis for the 3D twin because it already brings together a wealth of digital



ZugMap 2D



ZugMap 3D

geodata. This includes road and pathway maps, all types of boundaries, digital cadastre data and usage plans, as well as environmental data, including water data. The aim was to make this diverse data accessible, understandable and interactive in

3D for the public using the digital twin. First, a digital 3D surface of the canton was needed.

The road to the goal

At the start of the project, a comprehensive survey of the entire canton area was carried out using hybrid LiDAR and aerial imaging technologies. Additionally, data from surveying three perimeters with vehicles, as well as reality capture images, was collected to create a 3D mesh, as well as a supermesh in specific areas. Three properties were also scanned using drones. For special use cases, interior scans were performed in four selected buildings.

Geodata can be accessed with a simple click, along with additional information. Most data is available either as a direct download or as a geoservice for integration into existing systems.

The collaboration was led by the Office for Land Register and Geoinformation, using the HERMES project management method. The project was largely managed by the project leads from the Canton of Zug and Octave. For each use case, coordination took place directly with the responsible personnel at the Canton to ensure technically accurate implementation.

For example, in the field of architectural heritage communication, the Office for Monument Preservation and Archaeology assisted with developing use cases and provided additional general data about the objects included in the study. The office also oversaw the laser scanning process.

No standing still: Plans for the future

The project leaders in the Canton of Zug are satisfied with what has been achieved so far, but do not want to rest. Added Geoinformation Specialist and Project Lead Yannik Pude, "It will probably take time for users to recognize the value of these new opportunities. But we are already working on expanded use cases."

The Canton of Zug is transitioning from the initial buildup phase to a regular dataset within its geodata infrastructure. Various approaches to data updating and

operation are being evaluated to manage ongoing costs as efficiently as possible. To plan future development in a targeted manner, a structured survey of potential use cases is being conducted in close collaboration with various stakeholders.

This opens up interesting possibilities, for example, in architectural heritage communication, which also requires careful oversight. It demands research and innovative collaboration among politicians, administration, businesses and the community, as well as improved (digital) communication and participation tools. Only together can the ambitious digital transformation goals be achieved, and with the realization of the 3D digital twin of the Canton of Zug, Octave and the Canton have taken a major step forward together.

About Octave

Octave is a leader in enterprise software, turning data into decisive action and intelligence into your edge. Our software solves for and simplifies complexity, from the design and build to operations and protection of people, property and assets – for any scope, at any scale. For decades, we've partnered with customers to sharpen performance, elevate efficiency, and amplify results. From factory floors to entire cities, our solutions are tuned to scale up what's possible from day one onward.

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