

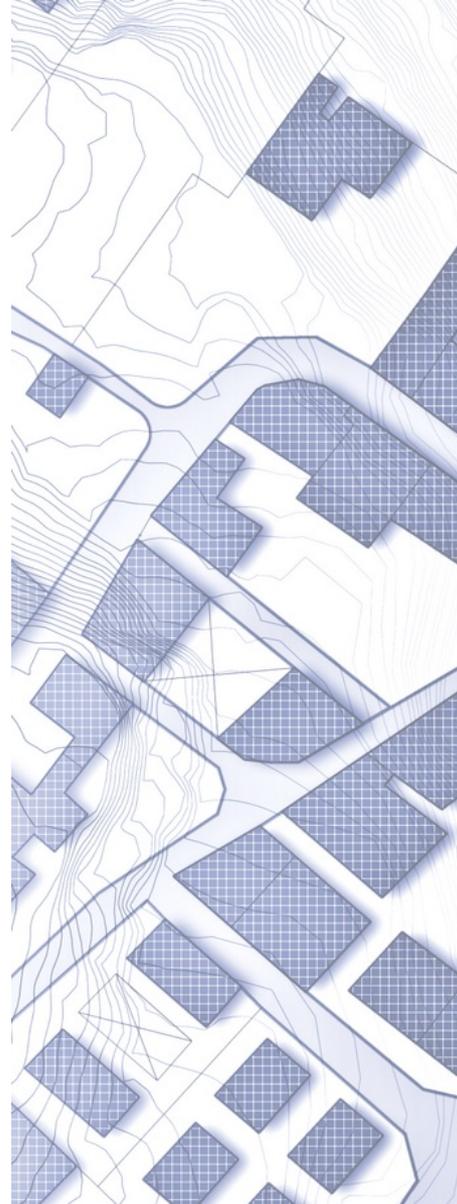
SWISS TERRITORIAL DATA LAB

A CO-CREATION INITIATIVE TO PROMOTE DATA
SCIENCE ON TERRITORIAL DATA

DIGITAL INNOVATORS – UNIGE – CUI

2021-10-06

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INTRODUCTION

- **Our Initiative & Objectives**

Foundation and funding of the STDL initiative and its strategy

- **Our Projects**

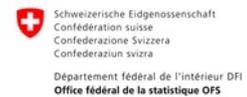
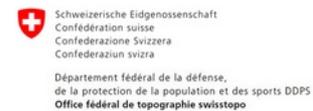
An overview of the current and past projects

- **Our Developments**

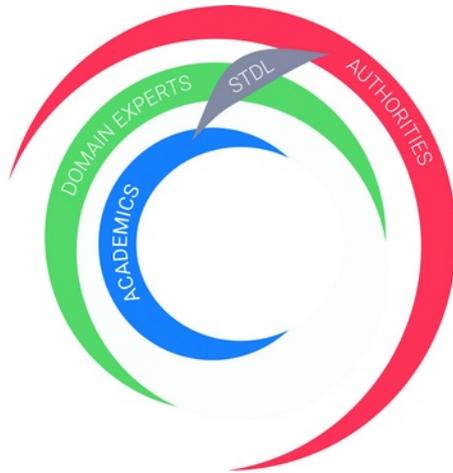
An overview of the developed long-term solutions

INITIATIVE & OBJECTIVES

- **Joining forces**
Bringing together Academics, Domain Experts and Authorities
- **Funded by Territorial Actors**
An initiative funded by INDG uniting Swiss land registers
- **Data science and territorial data**
Combining data science and territorial data to propose new solutions



As the **Authorities** formulates the needs and goals of territory management, the **Domain Experts** find and apply relevant processes and solutions



Swiss Territorial Data Lab
A proposed bridge between
Academics, Domain Experts
and Authorities

Under a close collaboration between **Domain Experts** and **Academics** , realistic, feasible and relevant new solutions can be brought out of research

Collaboration

- **Needs as a bootstrap**

Identifying reasonable and well-defined needs of Domain Experts to bootstrap a project

- **A close collaboration**

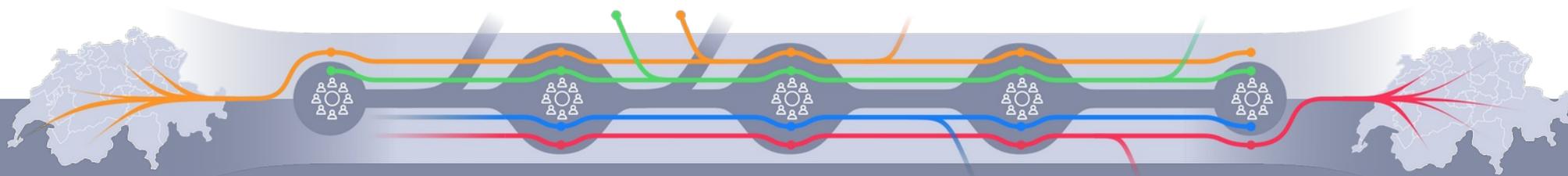
The project is conducted in close collaboration with Domain Experts to keep project on track

- **A scientific methodology**

A scientific methodology is applied to the developed proof-of-concept and for its results to ensure reliable accuracy and precision

- **Replicate & broadcast**

The developed proof-of-concept and the methodology are carefully documented to allow reproduction on other areas



- **Swiss territorial data**

Leveraging Swiss territorial data relevant to drive the development of the proof-of-concept

- **Project data**

Specialized existing data are always part of the project and their improvement is part of the objectives

- **Project results**

Results are produced all along the project and carefully reviewed by Domain Experts to ensure the requirements are met

- **Proof-of-concept**

A proof-of-concept is delivered as a solution and is the main transferable elements to fulfill needs on other areas

Project

FEDERAL BUILDINGS REGISTER

A COMPLETION PROJECT FOR OFS/BFS

- A federal register of buildings
An exhaustive inventory of buildings and related information
- Some information missing
The construction dates of buildings are missing
- A completion need
Combining data science and territorial data to extract construction dates

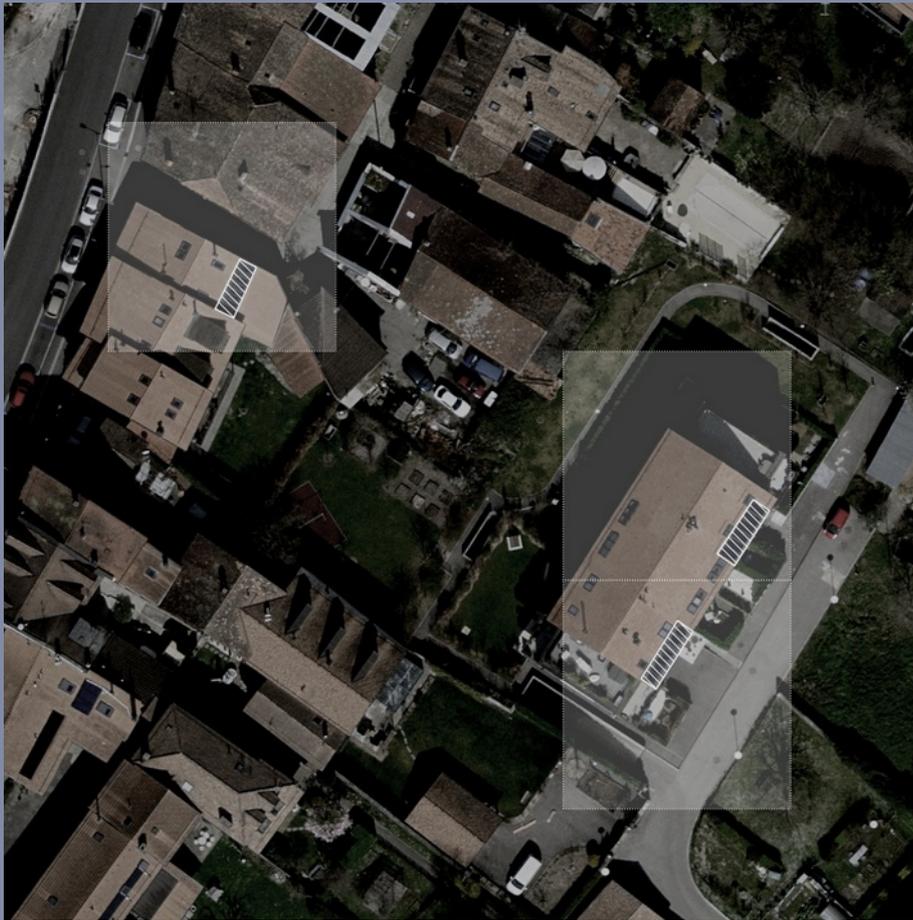


From historic
maps to
buildings
construction
dates for federal
register
completion

THERMAL PANELS DETECTION

AN UPDATE FOR GENEVA AN NEUCHÂTEL

- **Following the surface deployment**
In front of climate challenges, following the production surfaces
- **An update challenge**
Available database are maintained based on paper works
- **Need for a regular inventory**
Using aerial image to track life-cycle of thermal panel installations



From aerial
images to
domain experts
database
updates and
audit

QUARRIES AND SWISS RESOURCES

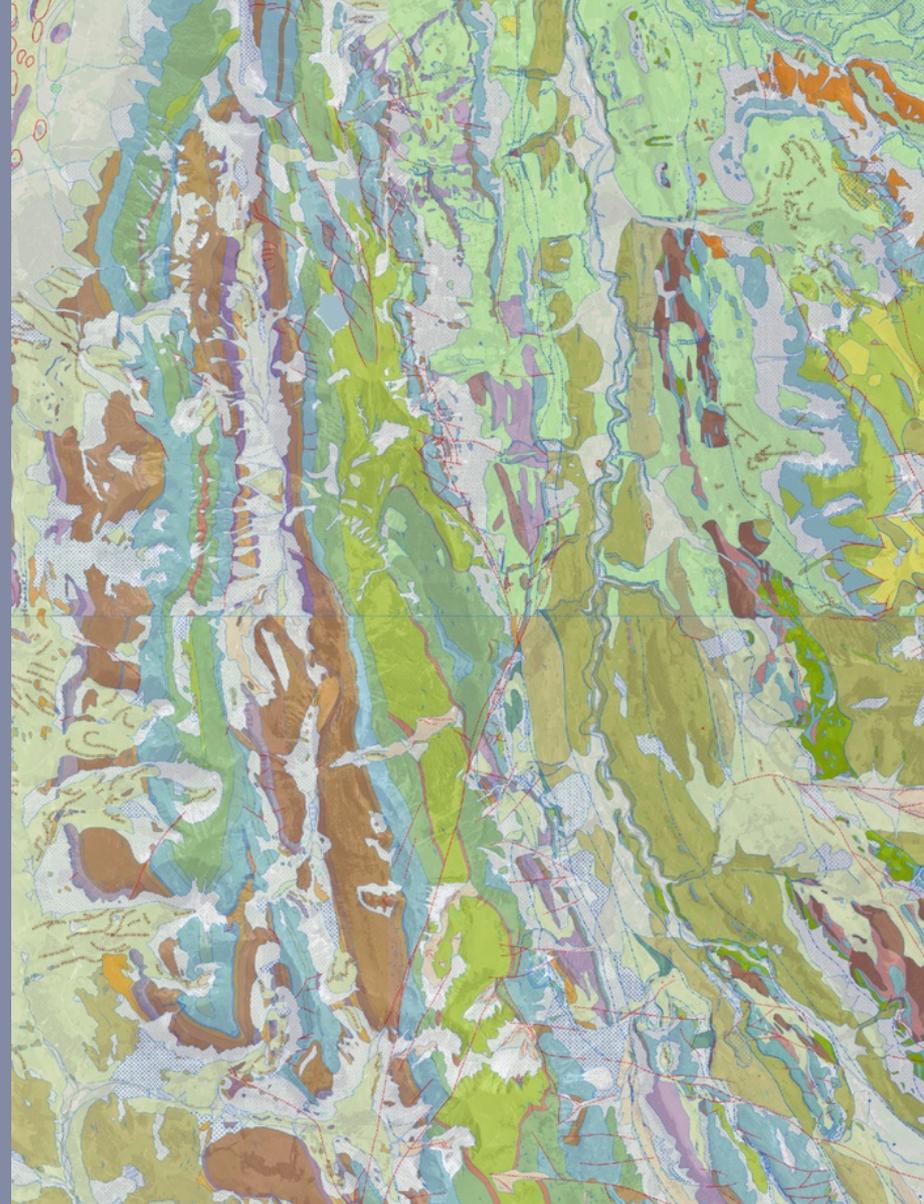
A NEW PROCESS FOR SWISSTOPO

- **Strategical resources**
Material extracted in quarries are part of national strategic resources
- **Understanding the exploitation**
A required view of the quarries evolution and exploitation of resources
- **Need for regular view of resources**
Using object detection, following the evolution of quarries



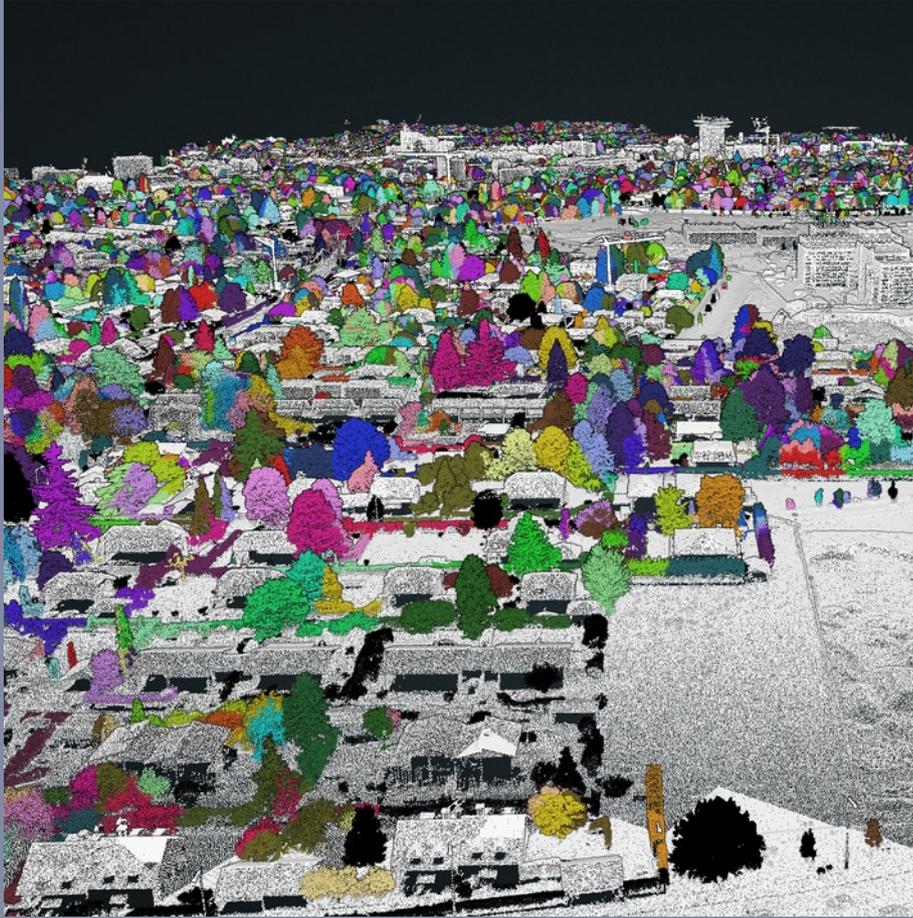
From aerial
images to
quarries
inventory and
evolution survey

Combining detection
polygon with geological
data to identify the
exploited resources in an
automated way



ISOLATED TREES IN CITIES AN INVENTORY FOR GENEVA

- An incomplete database
The isolated trees inventory is incomplete and complex to complete
- A tremendous workload
It took twenty years to inventory half of the isolated trees on Geneva
- A need for more efficient processes
Investigating the use of LIDAR and images to detect trees and their properties

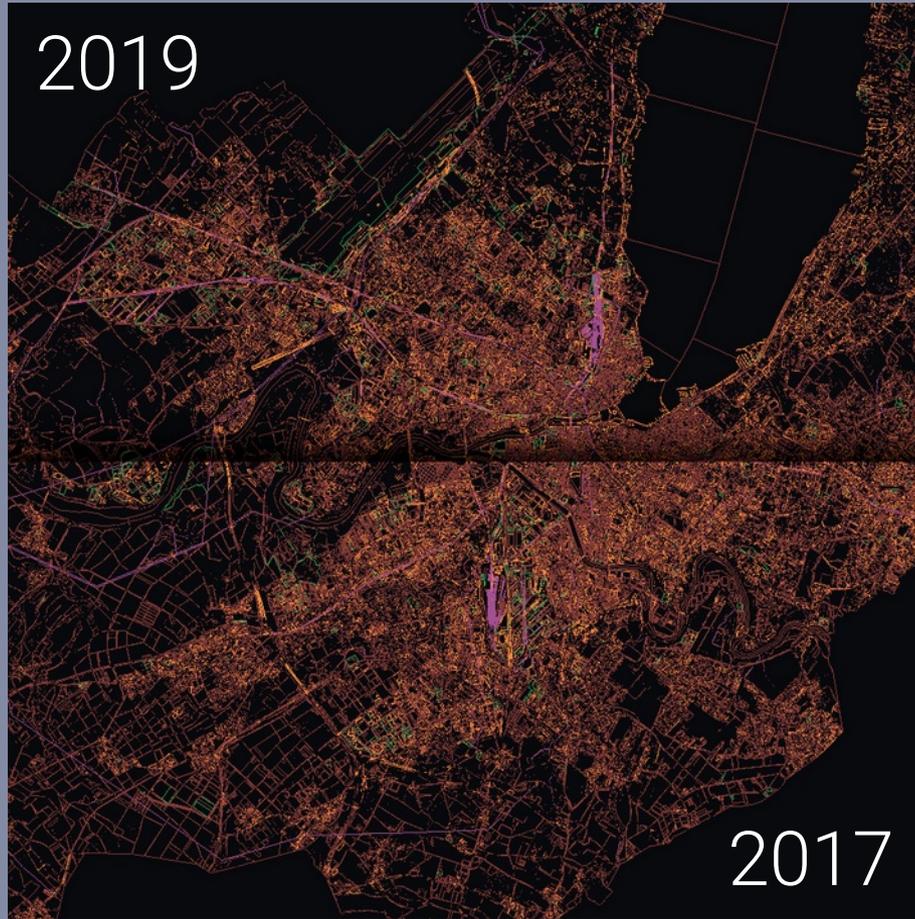


From LIDAR
model to trees
inventory with
relevant
properties
measured from
the 3D models

LAND REGISTER DERIVATIVE

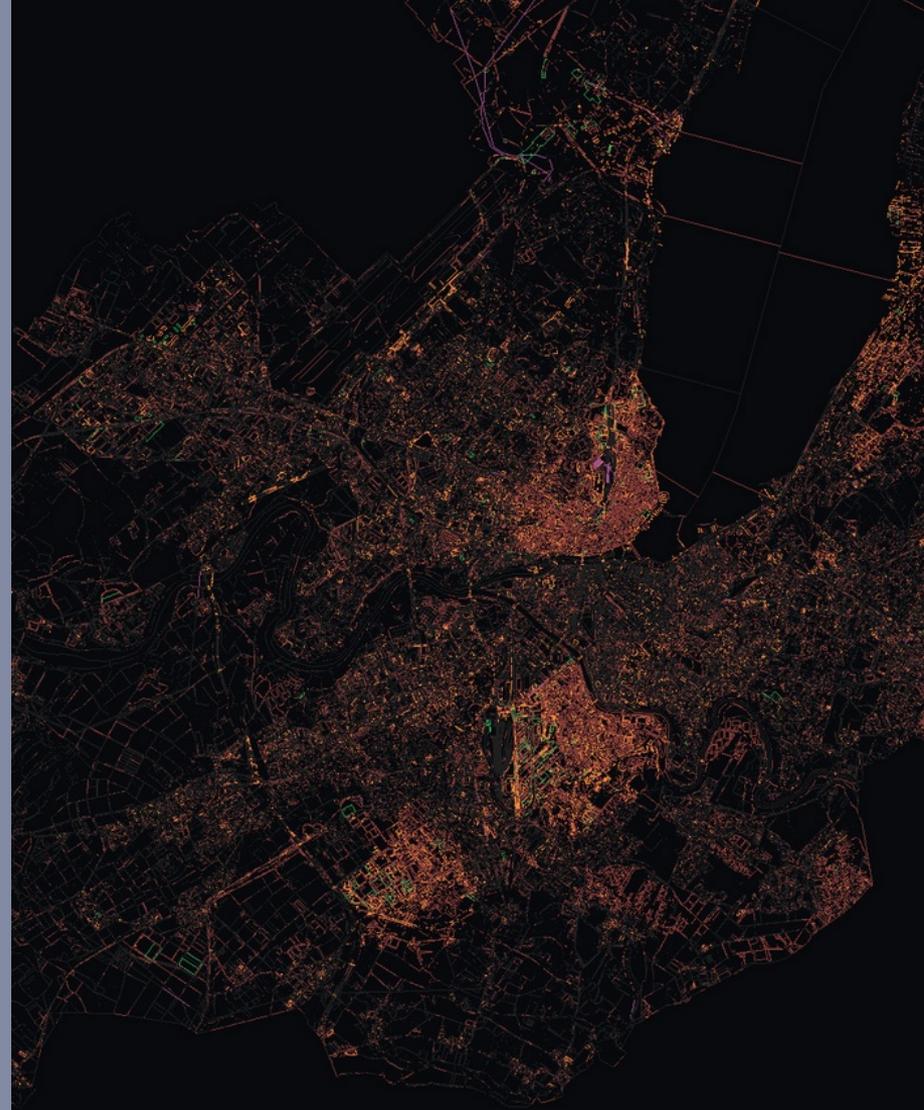
AN VIEW OF LAND REGISTER EVOLUTION

- An impressive geographic model
Swiss land register is an high-quality model containing many information
- A living model
A model in constant and high frequency evolution
- Extracting difference models
Demonstrating that the time dimension keeps large amount of relevant data



From temporal
slices of the land
register model ...

... to on-the-fly difference models as a tool to visualize and audit the evolution of land register



DEVELOPMENTS

- Synthesizing the needs

As many projects are conducted, current needs can be understood

- Guided developments

The developments are made within projects, ensuring their relevancy

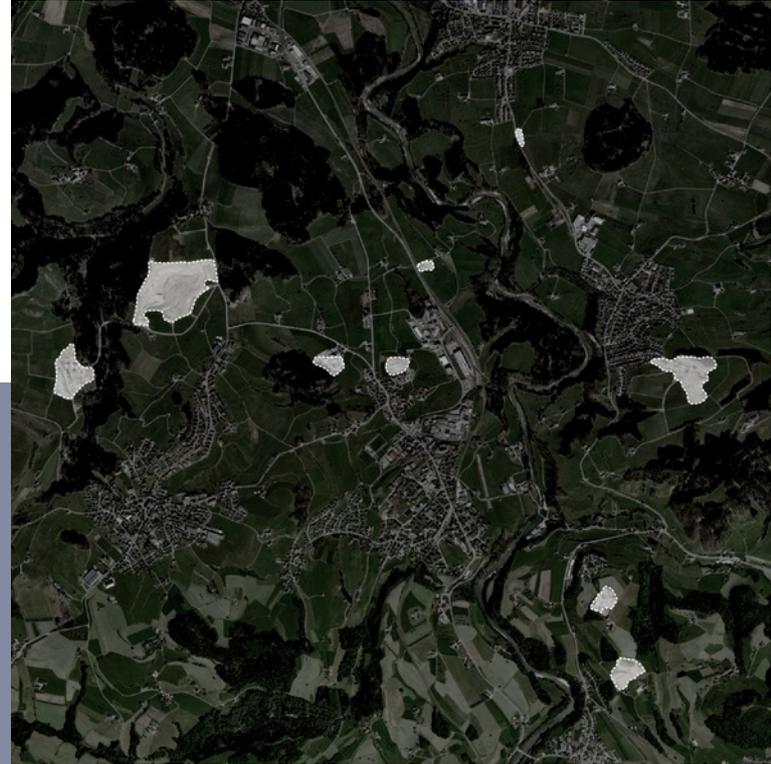
- Moving toward *genericity*

Developing generic solutions able to solve more than specific needs

OBJECT DETECTOR FRAMEWORK

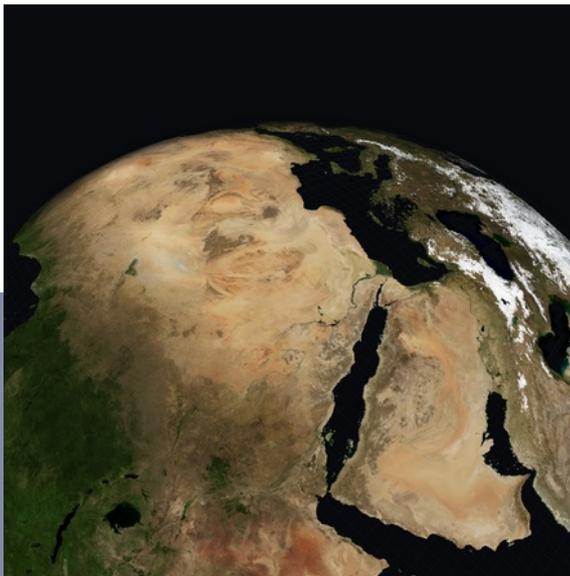


Geo-referenced labels associated with images as the only input

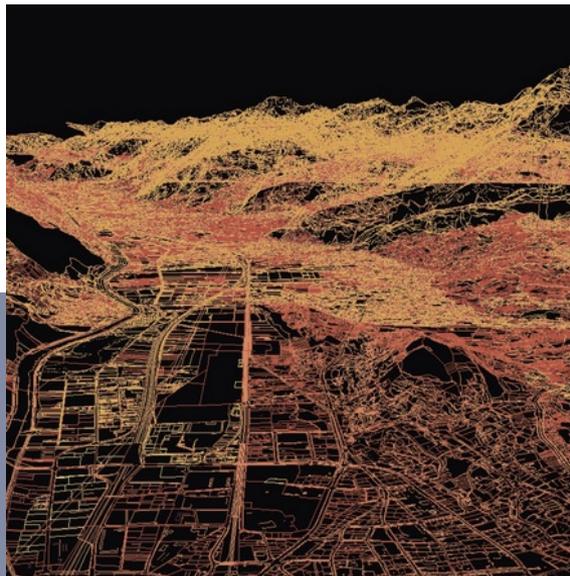


A trained network able to propose specific object predictions on similar images

4D PLATFORM FRAMEWORK



Topographic point-based data covering the whole planet

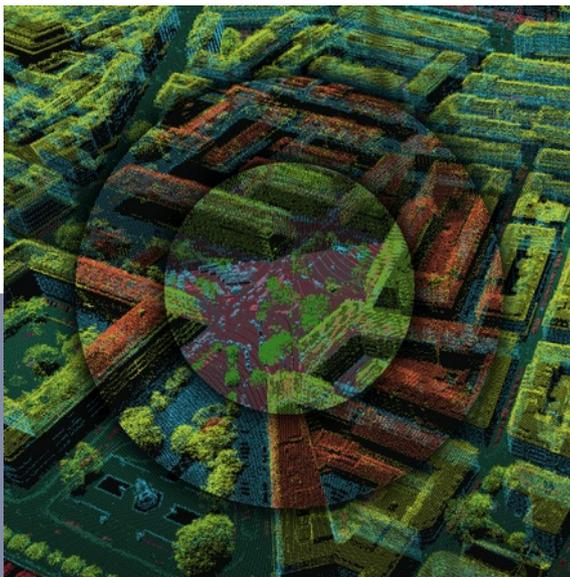


Swiss land register vector data covering the country



Colored LIDAR point-based data covering cantons

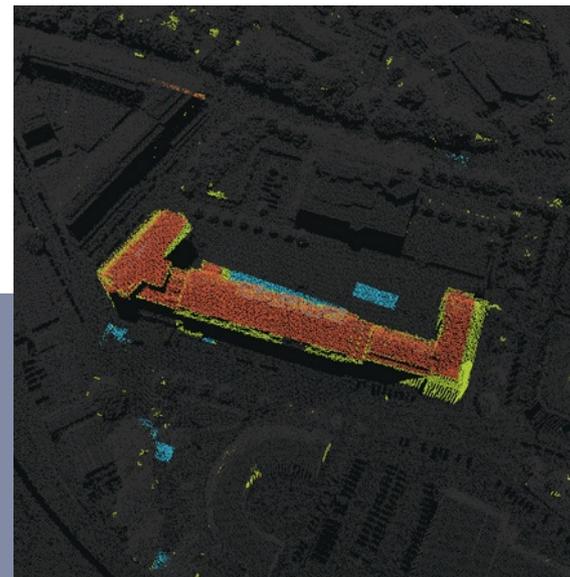
4D PLATFORM FRAMEWORK



Ingesting temporal slices to give access to evolution of data



Ensure a better communication between different data



Derivative operator applied on data such as point-clouds



Swiss Territorial
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Collaborate with STDL

A project in mind ? Contact us at info@stdl.ch or on stdl.ch

Contribute to STDL

Read our project reports on tech.stdl.ch and join us on [Git](https://github.com/stdl)Hub

Our Partners



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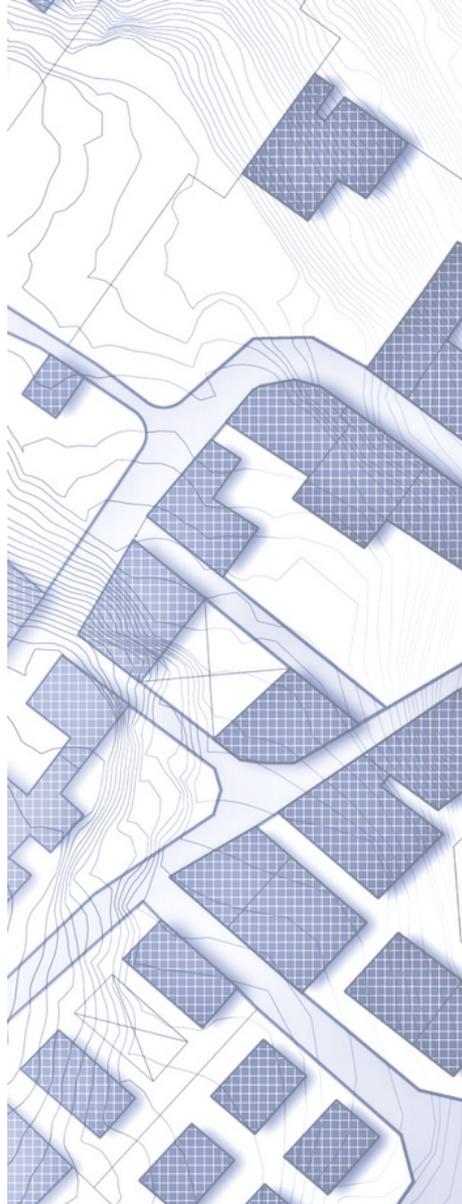
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