

LASTIG lab.

A short introduction

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<https://www.umr-lastig.fr/>

LASTIG lab

- Research in **Sciences and Technologies in Geographic Information**
 - Context: climate change, environmental and societal impacts
- **Objectives:**
 - Data, knowledge, methods and tools for modeling, analysis, simulation and visualizing the territories and spatio-temporal phenomena
- In-between:

<ul style="list-style-type: none"> ○ Computer Sciences <ul style="list-style-type: none"> ■ Machine Learning ■ Image/Signal processing ■ Physical measures ■ Computer Vision ■ Computer Graphics ■ Visualization ■ Human-Computer Interaction 	<ul style="list-style-type: none"> ○ Geography ○ Social and Human Sciences ○ Environmental Sciences
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LASTIG lab

- **Environmental transformations:** *public policy monitoring (land-use/land-cover, Common Agricultural Policy), pollution, urban climate, flooding, etc.*
- **Historical and social mutations:** *past urban dynamics, urban planning, archival data analysis*

→ Multi-source, multi-scale, massive, inaccurate and massive data.

ABR
Aaron, bronzes et pendules, passage Choiseul, 72 et 74.
Aaron (Michel), manuf. de porcelaine, Bondy, 30.
Abadie, architecte, passage Char
Abadie, architecte, Provence, 7.
Abadie, tabac, Menilmontant, 11.
Abadie, professeur d'escrime, A
Abat, rentier, Hâvre, 12.

Text

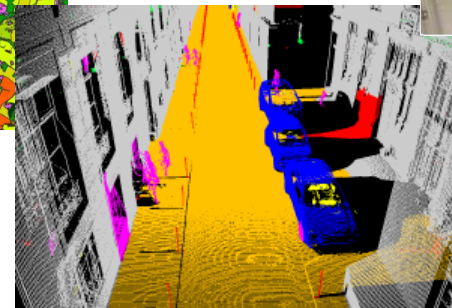


Maps



Vector data

3D data



Geospatial imagery

ID card

Basic info:

- LASTIG = IGN-ENSG + Université Gustave Eiffel + Ecole des Ingénieurs de la Ville de Paris (EIVP)
- Method-based researches with an operational flavour
- **Current project time frame: 2026-2030**
- *Interdisciplinarity, open and reproducible science*

Composition

- **45** permanent members

(5 DR, 6 CR MTE, 9 MCF/EC, 14 Ing. DR,
11 IE/IR)

(40 IGN, 3 Univ Eiffel, 2 EIVP)

- 25 PhD, post-doc, engineers



ID card

4 teams

ACTE: Image/Lidar/Radar data acquisition and processing

STRUDEL: Spatio-temporal Structures for Spatial Analysis

MEIG: Mediation and Enrichment of Geographic Information

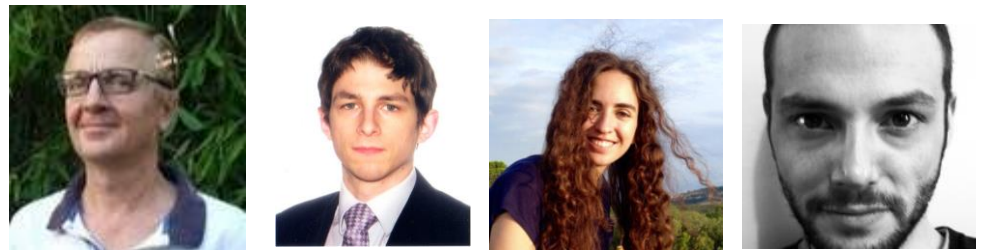
GEOVIS: Visualization, Interaction, Immersion

Management

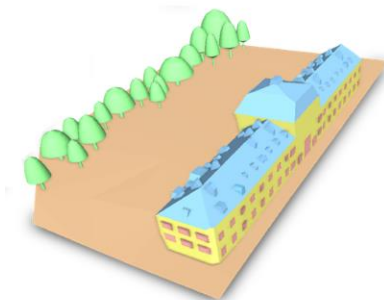
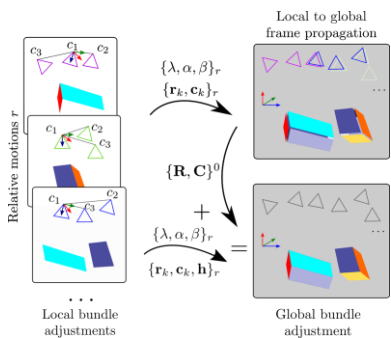


dir-lastig@ign.fr

Team leaders



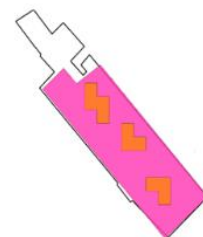
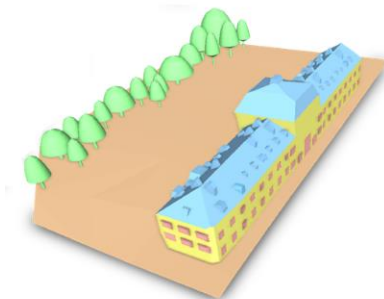
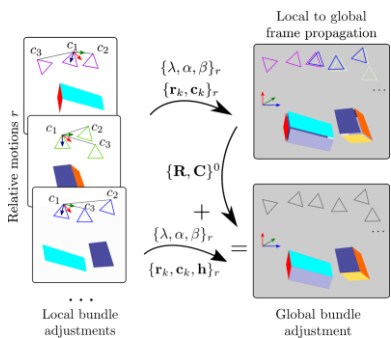
Structuration



Photogrammetry & reconstruction 3D

ACTE

Structuration

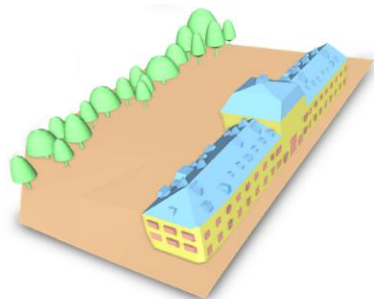
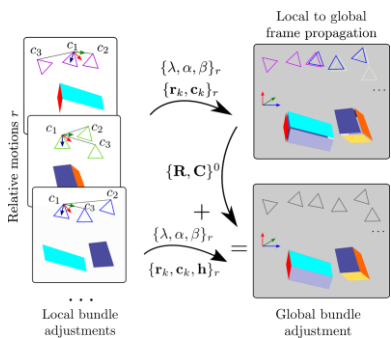


Photogrammetry & reconstruction 3D

Changes: validation & integration

ACTE MEIG

Structuration



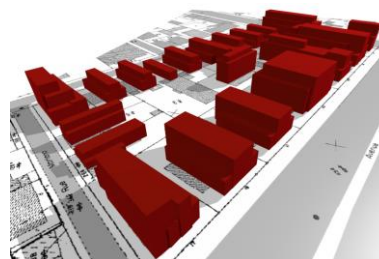
Photogrammetry & reconstruction 3D



Changes: validation & integration

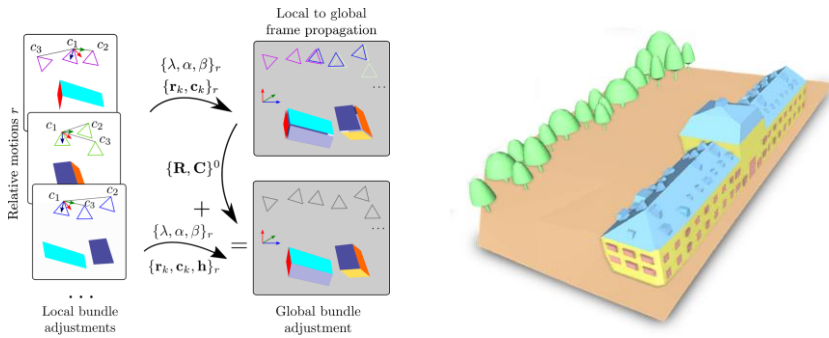
ACTE MEIG

STRUDEL



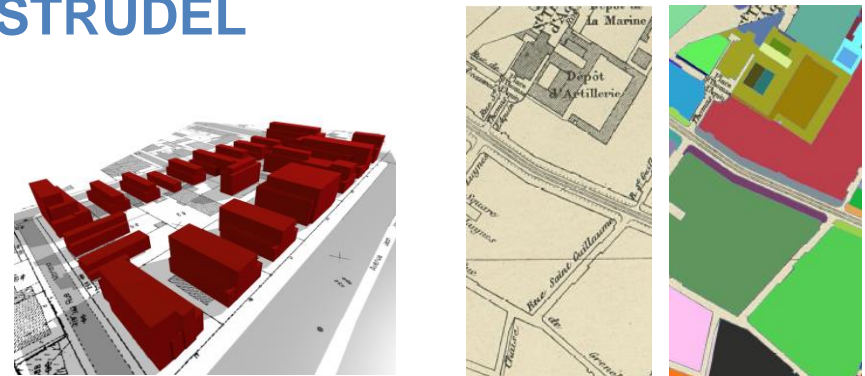
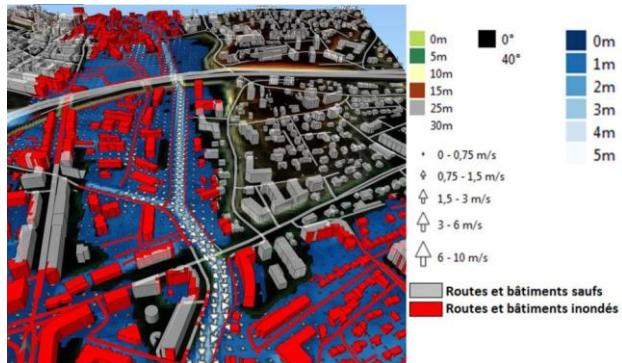
Simulation & temporal monitoring

Structuration

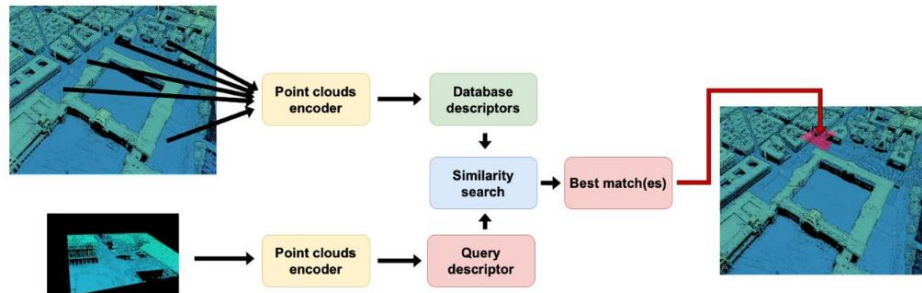


ACTE MEIG

GEOVIS STRUDEL

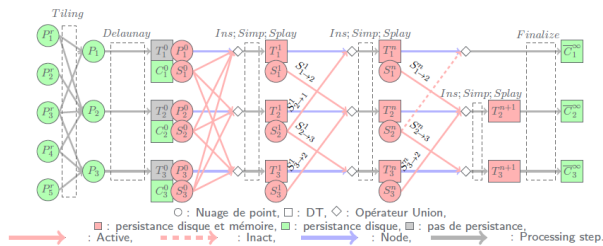


Structuration



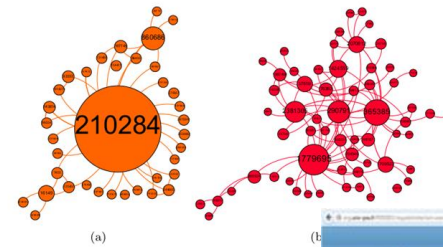
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Indexation and retrieval



Parallel computing

ACTE



Graph analysis

Text analysis



MEIG

GEOVIS

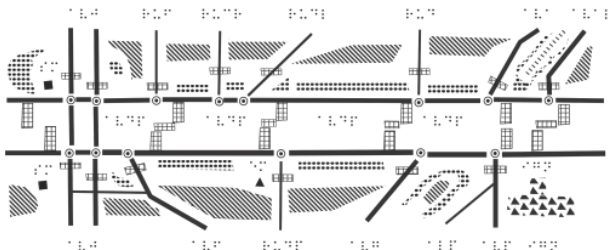
STRUDEL

2D/3D learning



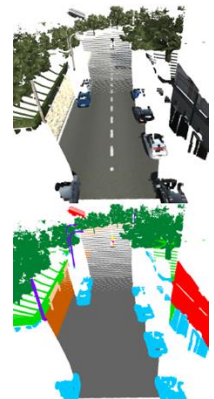
Augmented reality

Tactile maps



Visualisation & interaction

Complex systems



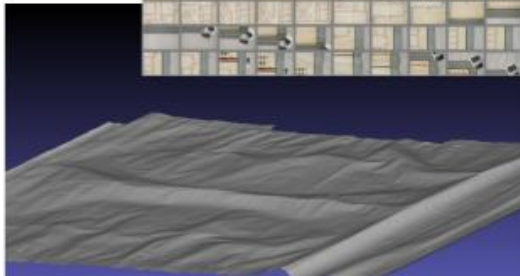
ACTE TEAM

- Spatial data acquisition techniques and photogrammetry



Stereopolis: multi-sensor 3D mobile mapping system for street visualisation and 3D metrology

MicMacV2 : Open source photogrammetric library

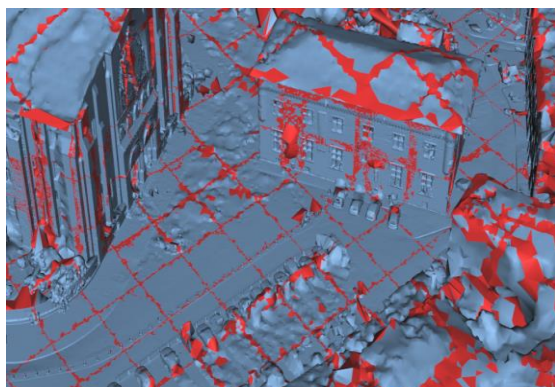
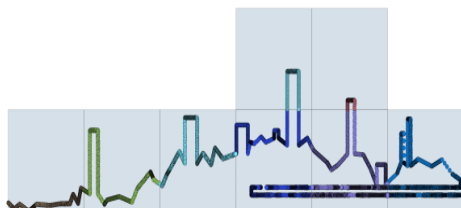
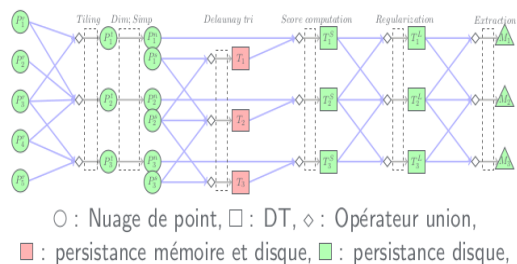


Backpack image/lidar acquisition

ACTE TEAM

■ Processing of raw data

Massive reconstruction of 3D surfaces



Texturing of 3D meshes

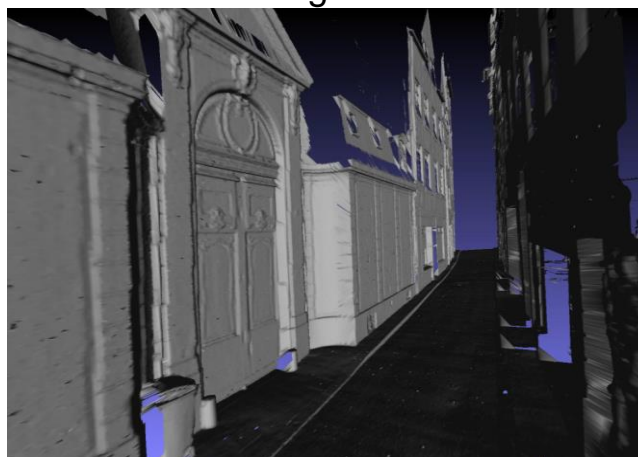
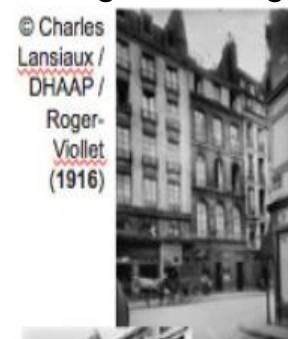


Image indexing/searching 3D

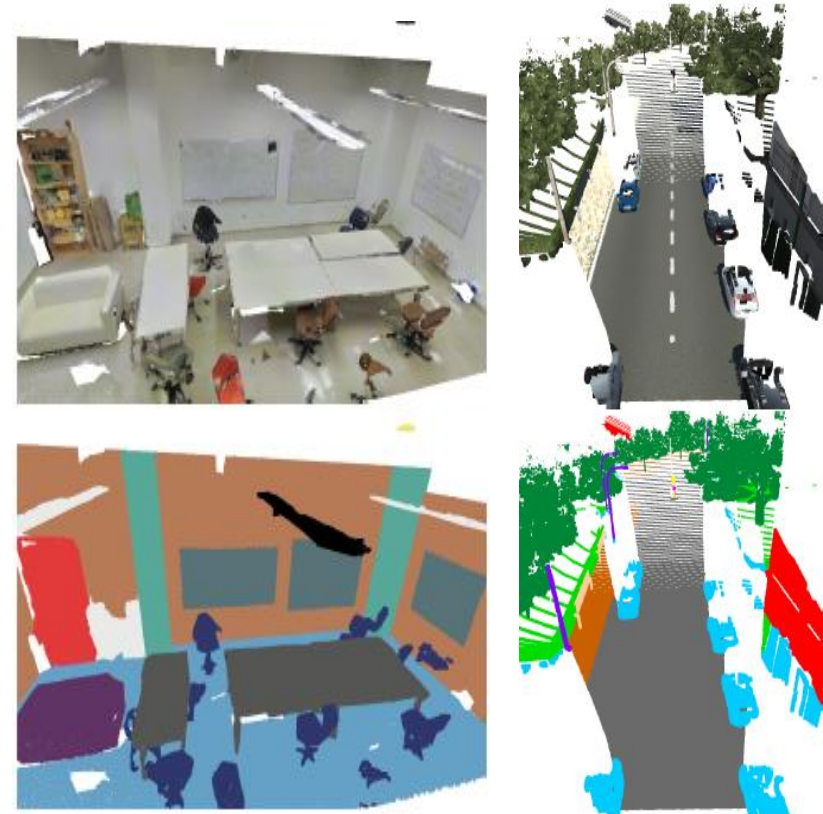
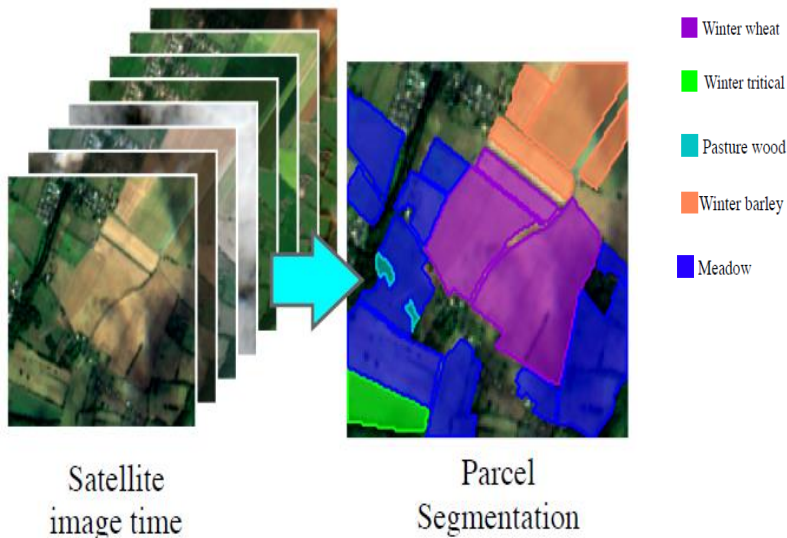


STRUDEL TEAM

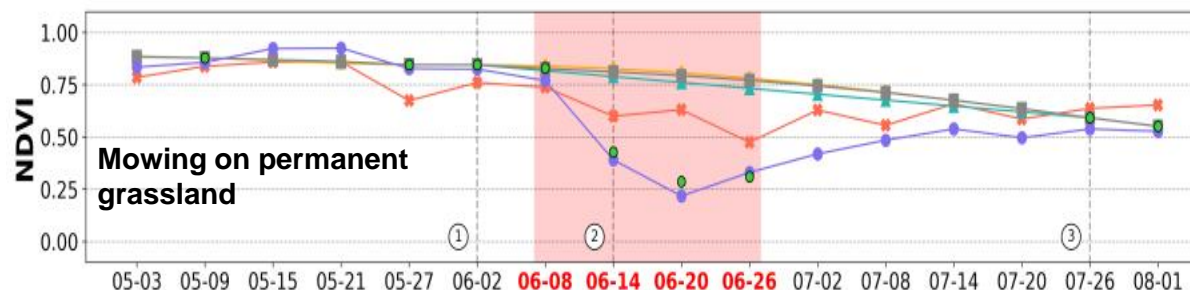
Fast and precise dynamic 3D scene understanding from LIDAR sensors

■ 2D/ 3D STRUCTURED PREDICTION

Parcel segmentation from multi-temporal satellite times series

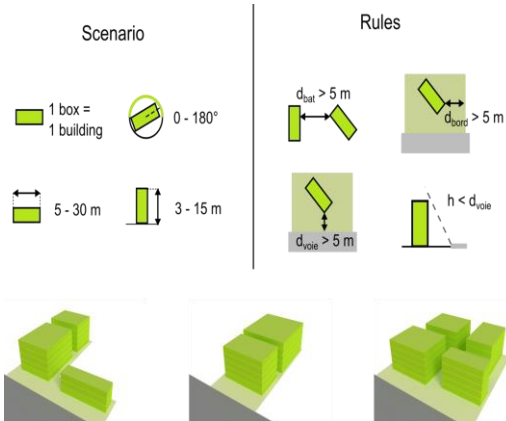
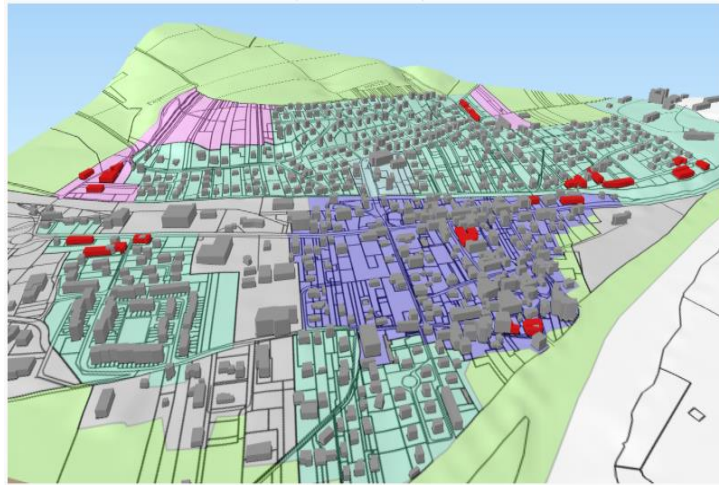


Grassland monitoring/change detection



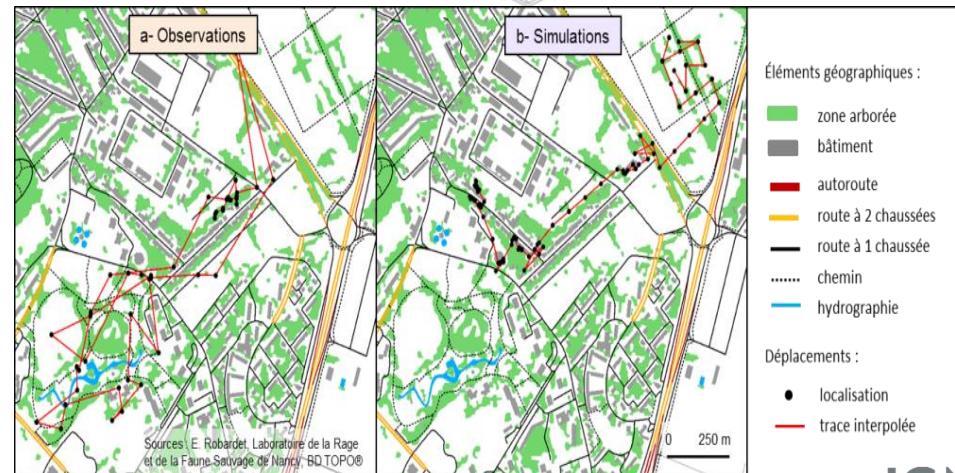
STRUDEL TEAM

■ Simulation and spatial analysis



Urban simulation by taking into account public policies

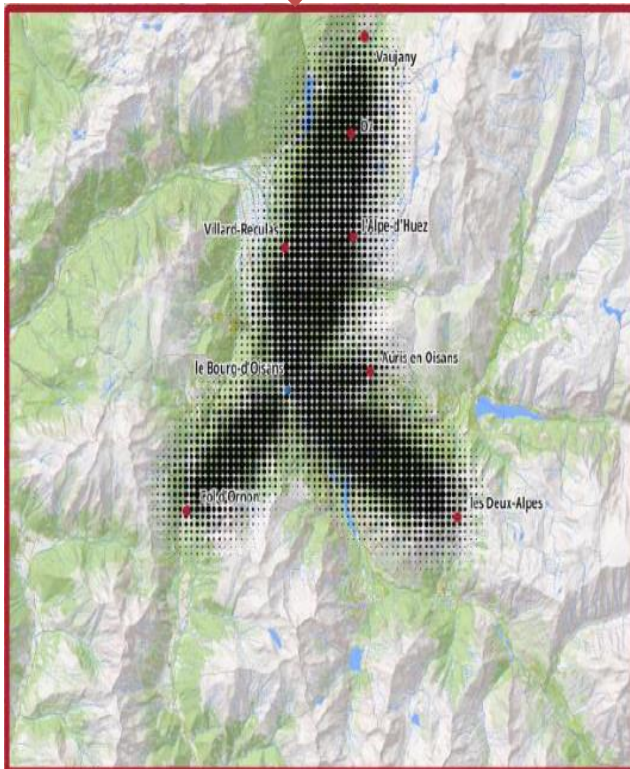
Street evolution in Paris from 1784-1894



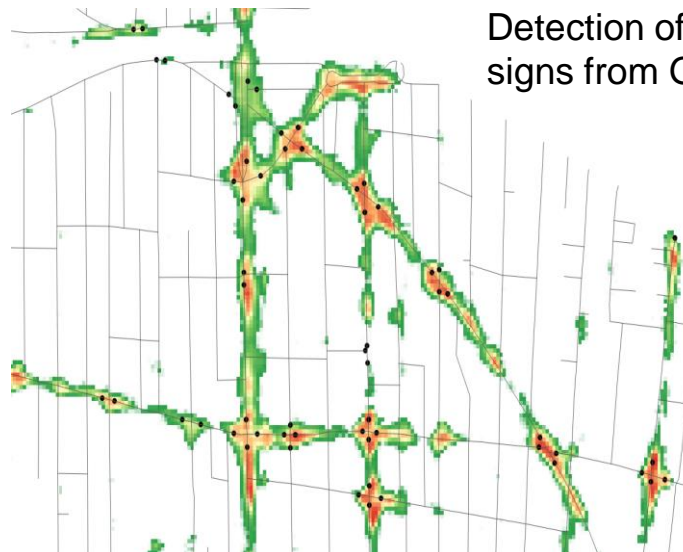
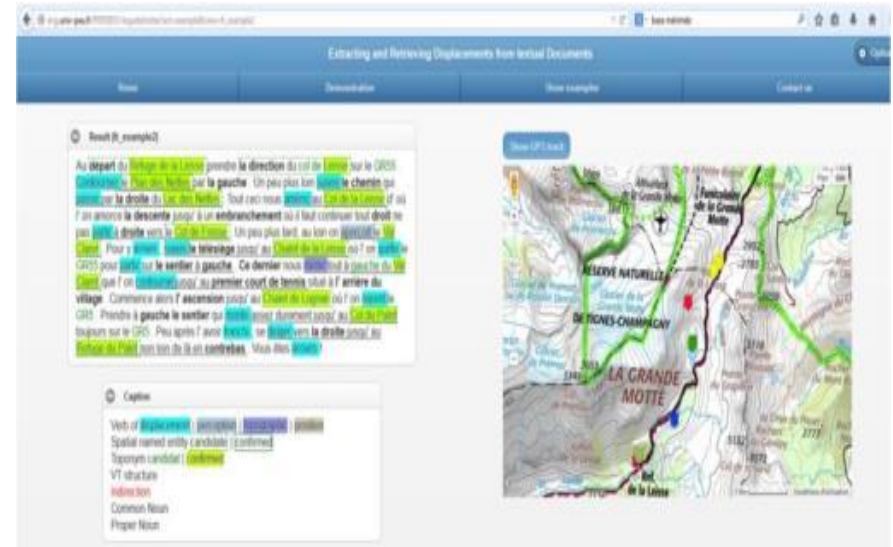
MEIG TEAM

■ SPATIAL DATA ENRICHMENT

« I started to walk from Bourg d'Oisans city and towards a ski resort », where am I ?



Road reconstruction from text

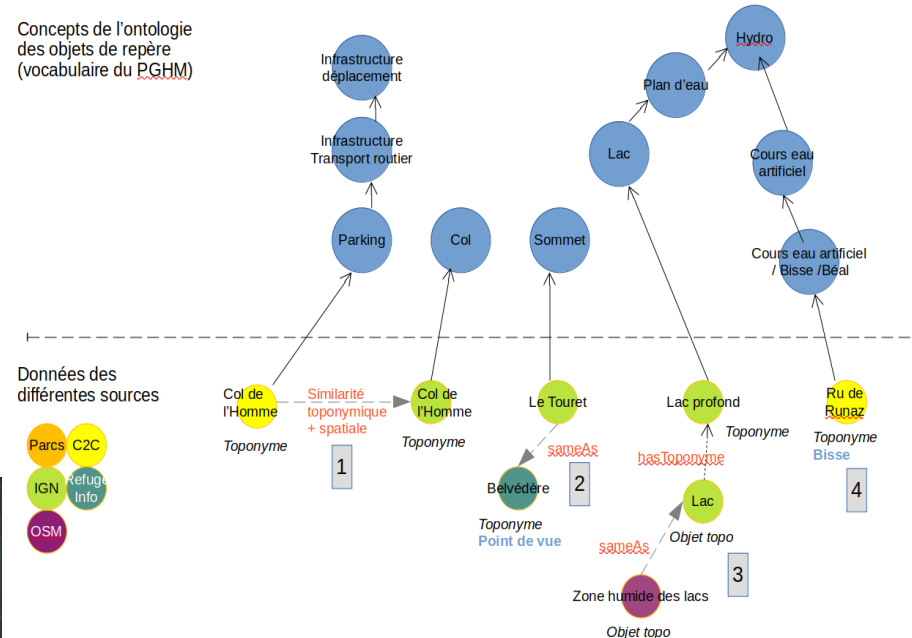


Detection of traffic signs from GPS data

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[illegible]

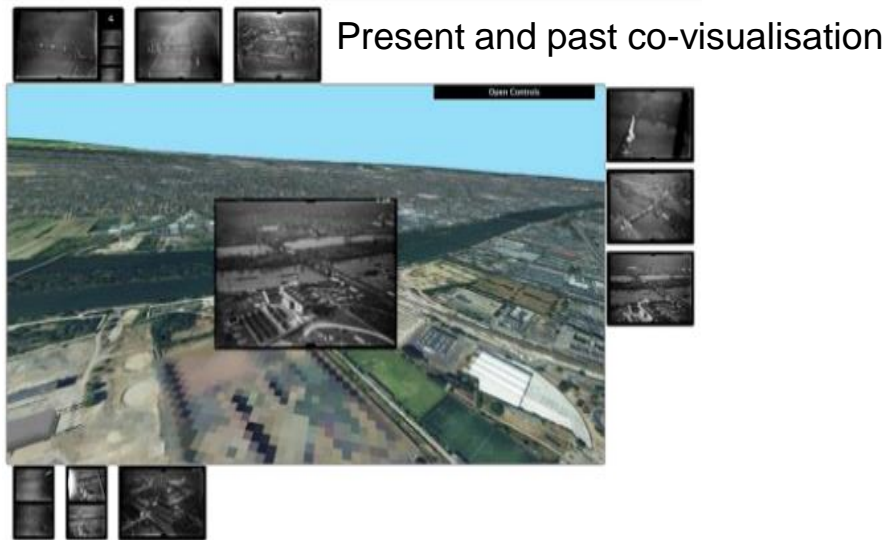
Concepts de l'ontologie des objets de repère (vocabulaire du PGHM)



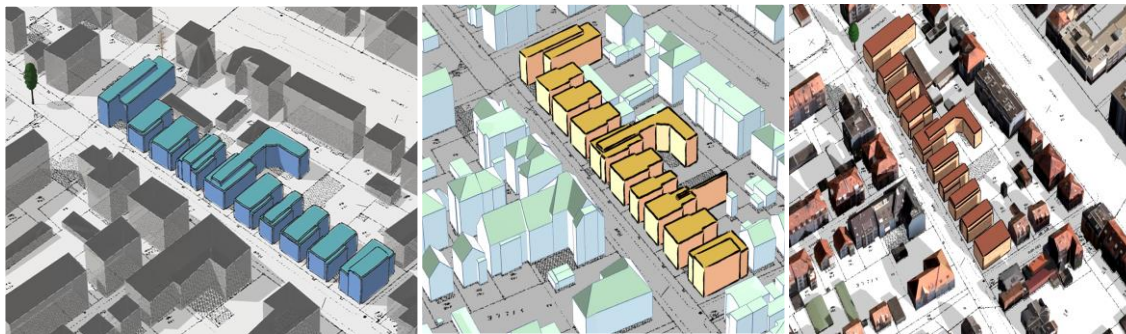
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GEOVIS TEAM

- Geovisualisation, representation, spatial cognition, interaction



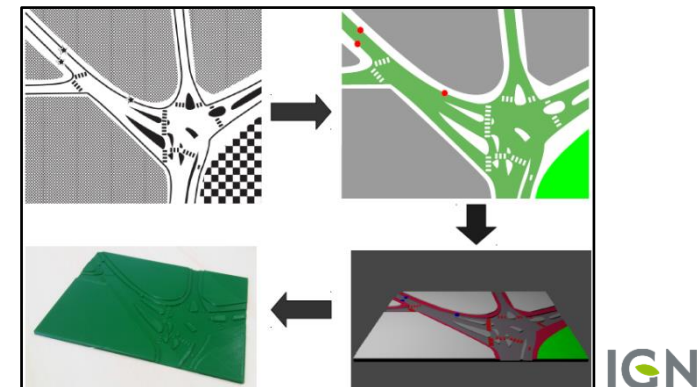
Adapting the representation to the user



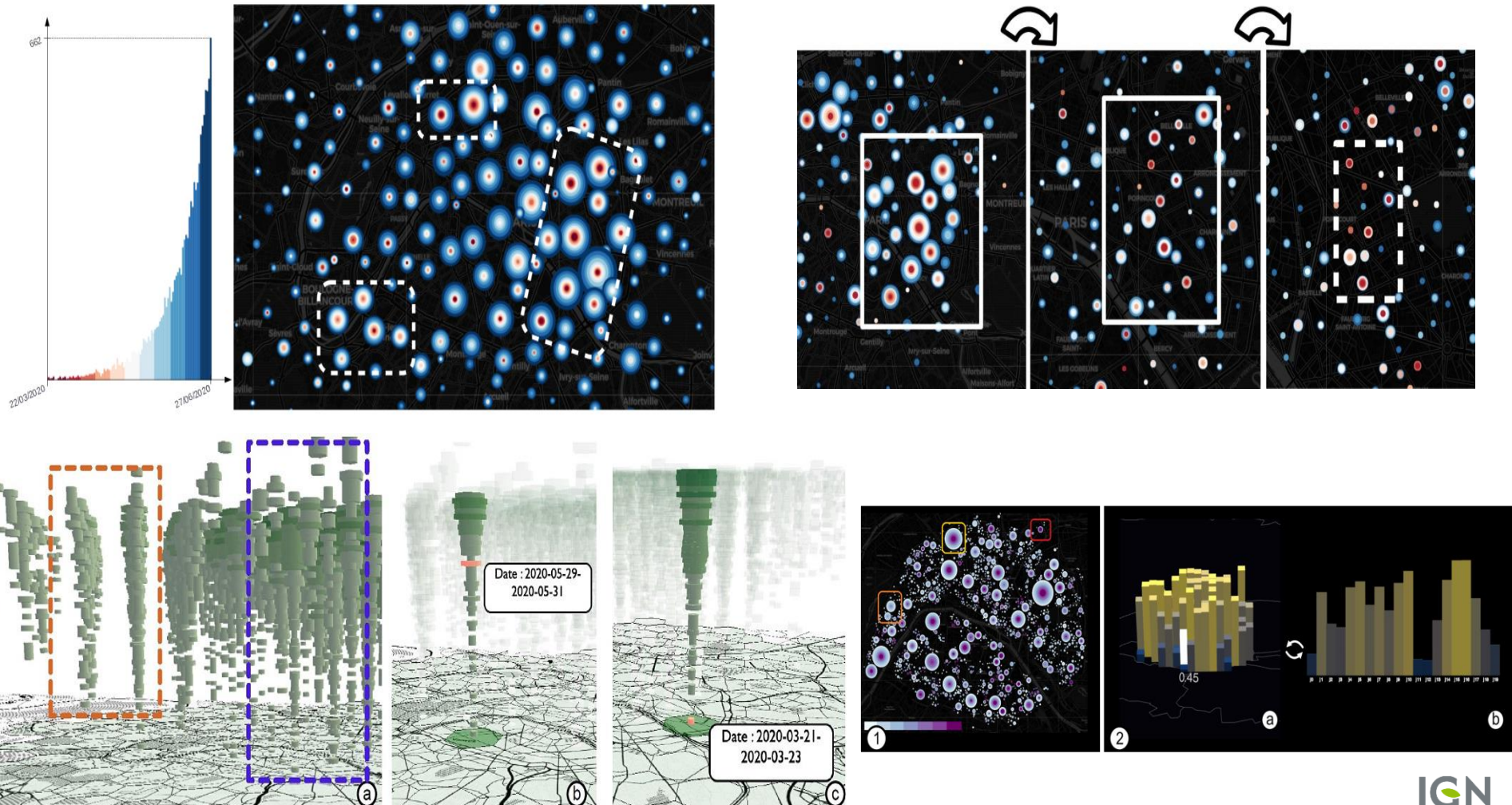
Style transfer



Maps for blind people



■ Spatio-temporal clusters of COVID data visualization



Territory dynamics @ LASTIG

ACTE:

- Deformation monitoring (buildings bridge, post-seismic)
- *3D change detection and update LiDAR/Image geometric change detection.* **Teng Wu**

STRUDEL:

- Spatio-temporal Analysis
- Temporal series analysis
- *Bi-temporal VHR image change detection with text.* **Yanis Benidir**

MEIG:

- Multi-source fusion for change detection
- *Seeing Urban Densification through the Buildings' Lens: A User-Oriented and Collaborative Approach.* **Ana-Maria Raimond**

GEOVIS:

- Visualization of dynamic processes (weather, epidemics,...)

Territory dynamics @ IGN

Mapping the anthropocene:

- Monitoring the impacts of anthropic activity in a context of
 - Climate change
 - Ecologic transition

Change detection an update in IGN production:

- Currently dispatched in various independent services/production units
- Roadmap for coordination and factorization of Change Detection and Update at IGN : **Nicolas Gonthier**