IGN
INSTITUT NATIONAL
DE L'INFORMATION
GÉOGRAPHIQUE
ET FORESTIÈRE

LandSense
A Citizen Observatory and Innovation Marketplace
for Land Use and Land Cover Monitoring

Feedback on the collaborative program managed by the French National Mapping Agency

Yolène Jahard[1], Ana - Maria Olteanu-Raimond[2], Marie-Dominique Van Damme[2], Bénédicte Bucher[2]

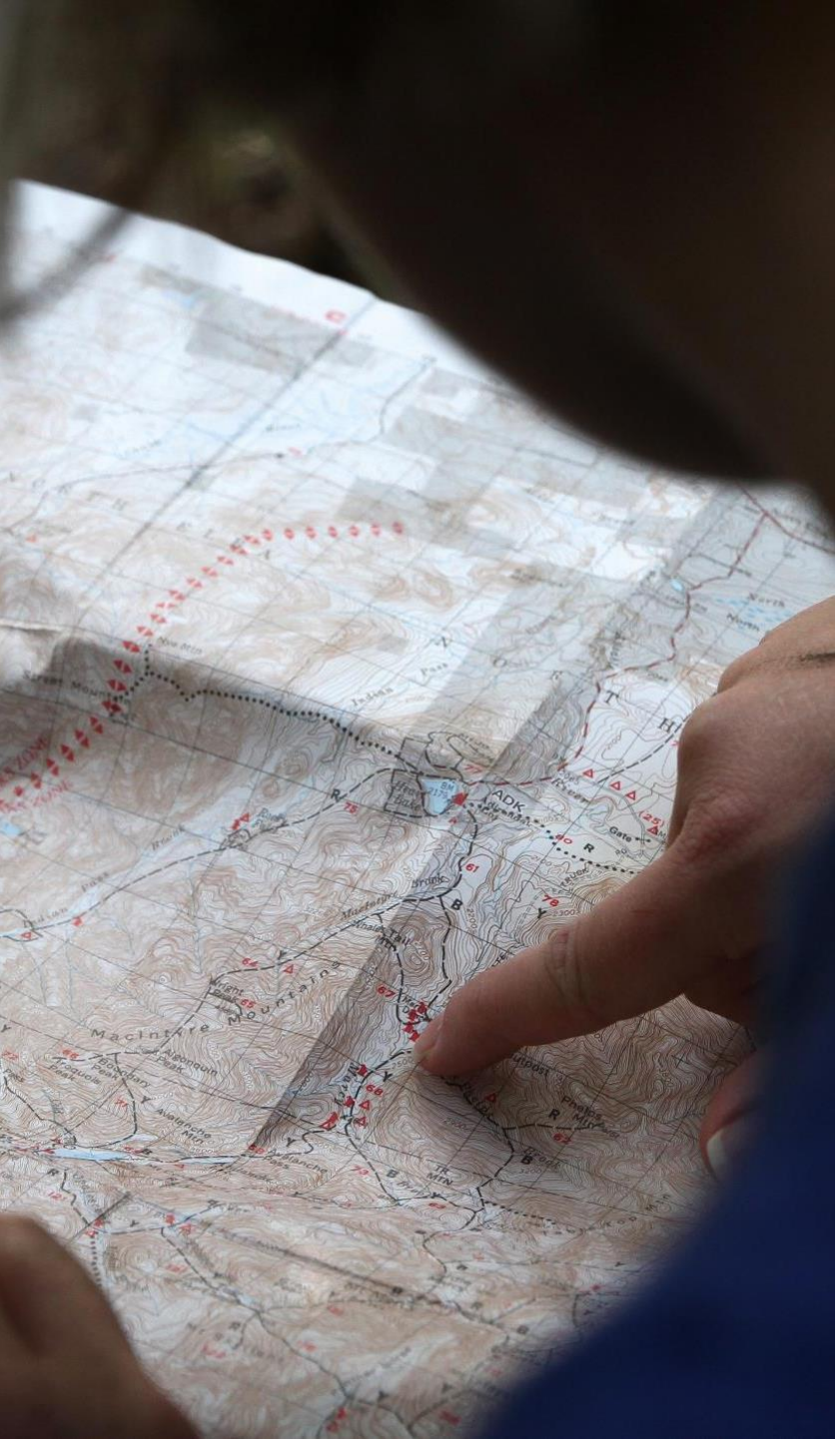
[1] Collaborative program, Direction of Programs, IGN, France
[2] Université Gustave Eiffel, LASTIG-MEIG, IGN, France

Leuven – January 16-17 2020

EuroSDR

European Commission

Horizon 2020
European Union funding
for Research & Innovation



Outline

- The new collaborative eco-system at IGN
- Crowd and community pilot: LandSense project
- Infolabs: Urclim project

THE NEW COLLABORATIVE ECO-SYSTEM AT IGN

TRANSFORMATION PATH

Partnerships
Win-win
Optimization
Cost saving
Synergy

Pilot projects

Living database
Quality system

Direct writing in a common database

Autonomy
Value creation
New players

Collaborative at the heart of the new Geo-platform

Open governance
Sovereign data

Scalable collaborative device to serve public policies

THE NEW COLLABORATIVE ECO-SYSTEM AT IGN

2 TYPES OF COLLABORATION…FOR 2 TYPES OF PARTNERS

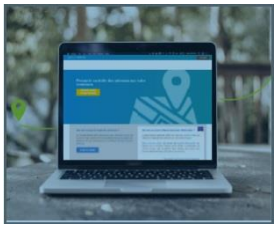
Data integration:
the partner provides its data

E.G : French ministry of education

Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE
MINISTÈRE DE L'ÉDUCATION NATIONALE

Co-production:
the partner participates to the mechanism

E.G : local communities for address



THE NEW COLLABORATIVE ECO-SYSTEM AT IGN

Mobile application

- EXISTING TOOLS

API

Flagging

- Simplified contribution: locate a flag and fill few fields
- Requires an expert to actually validate the data modification

API

Direct input

- Editing tools
- Control tools

API

Consultation
Extraction
Diffusion

Espace-collaboratif

Espace-professionnel

Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE

géoportail

Espace-collaboratif

GIS Plugins

Geoconcept

ArcMap

QGIS

Adress desk

Thematics desks

THE NEW COLLABORATIVE ECO-SYSTEM AT IGN

LEVERAGES FOR TRANSFORMATION

- Changing processes and production methods
  - Cross-functionnal program dedicated to coordinate the collaborative actions
  - Creation of multidisciplinary teams
  - Closer institutionnal relations

- Having new tools integrated into the Géoplateforme
  - Common API available
  - Integration tools
  - Co-production tools

- Stimulate the collaborative network
  - Linked with the open governance program
  - Based on the user communities
  - Coordinated with existing territorial animation

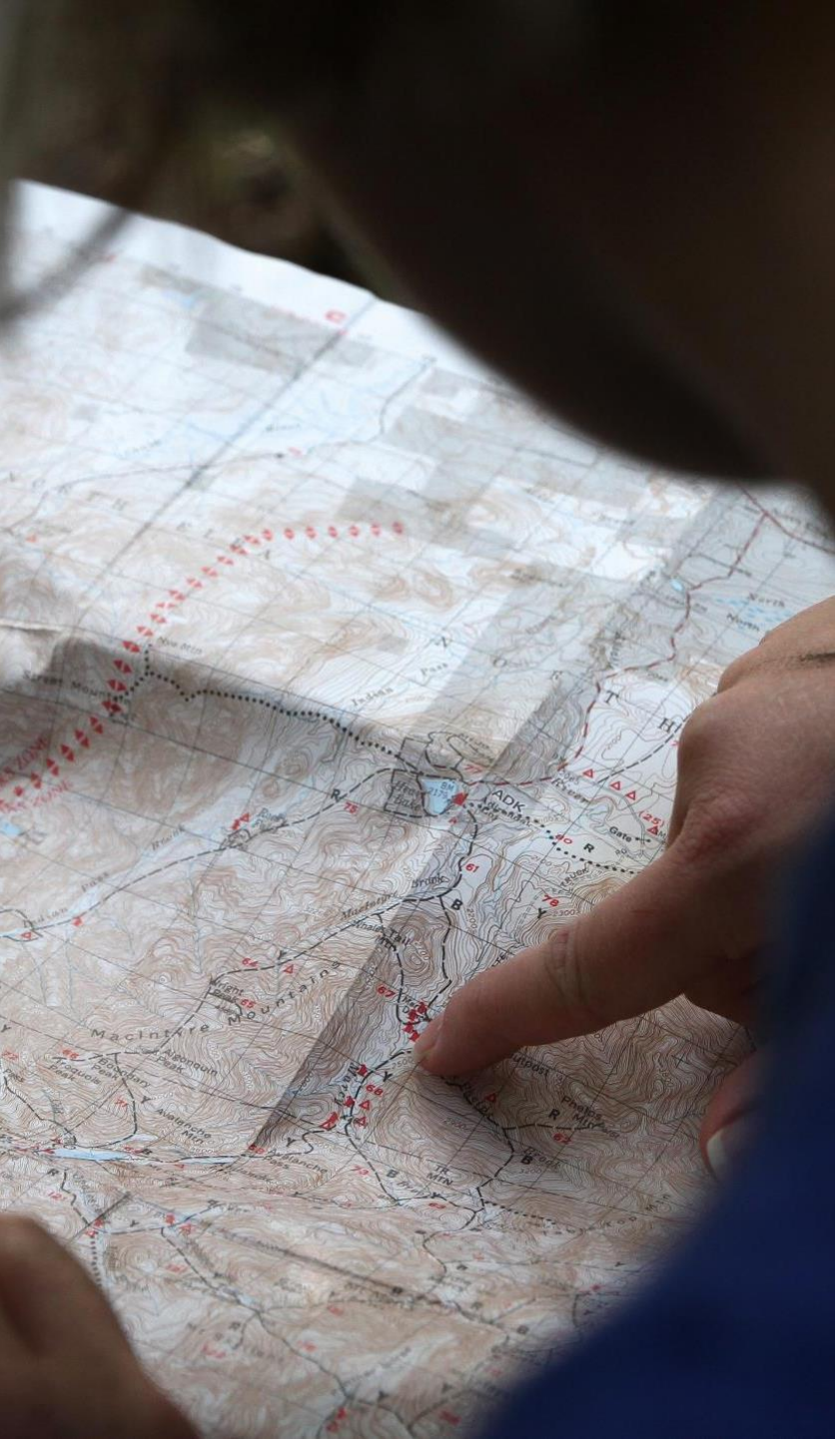
THE NEW COLLABORATIVE ECO-SYSTEM AT IGN

A FEW FIGURES

- 300 national partners impacting more than 200 000 objects by year
- 4000 local authorities involved into the address desk
- 15000 new or modified address each month
- 40% of the POI directly derived from partner data
- 4000 flags reported each month to help updating the data

On going process!

IGN



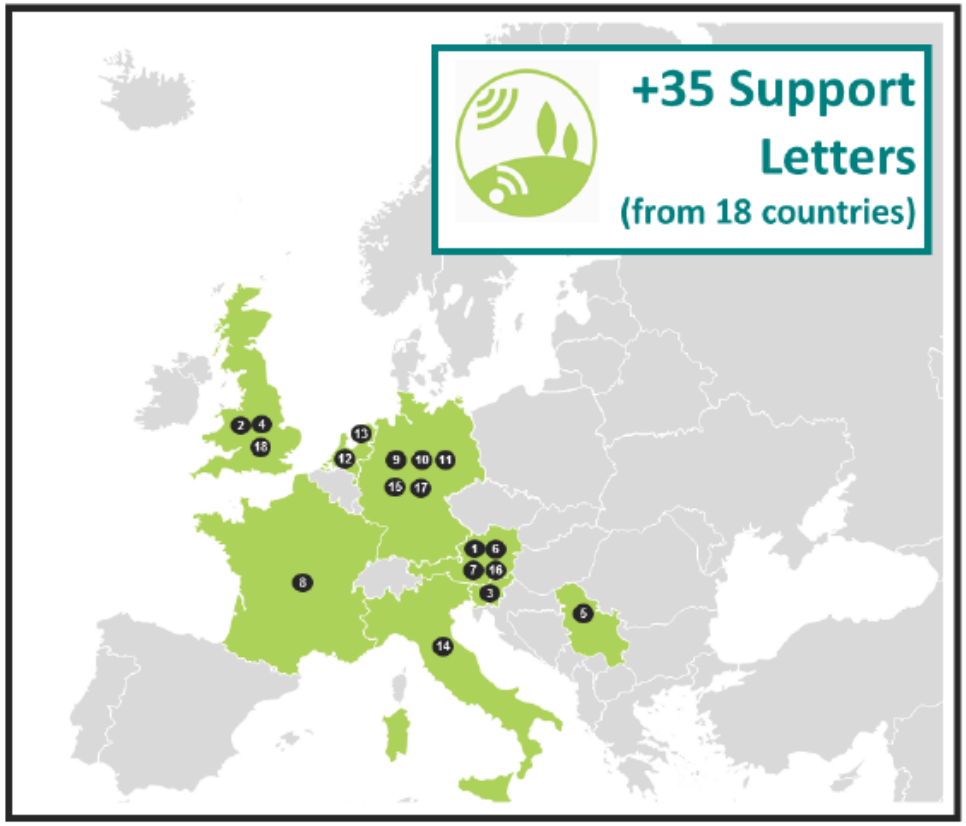
Outline

- The new collaborative eco-system at IGN
- Crowd and community pilot: LandSense project
- Infolabs: Urclim project

LANDSENSE

A Citizen Observatory and Innovation Marketplace for Land Use and Land Cover Monitoring

LANDSENSE : CONSORTIUM

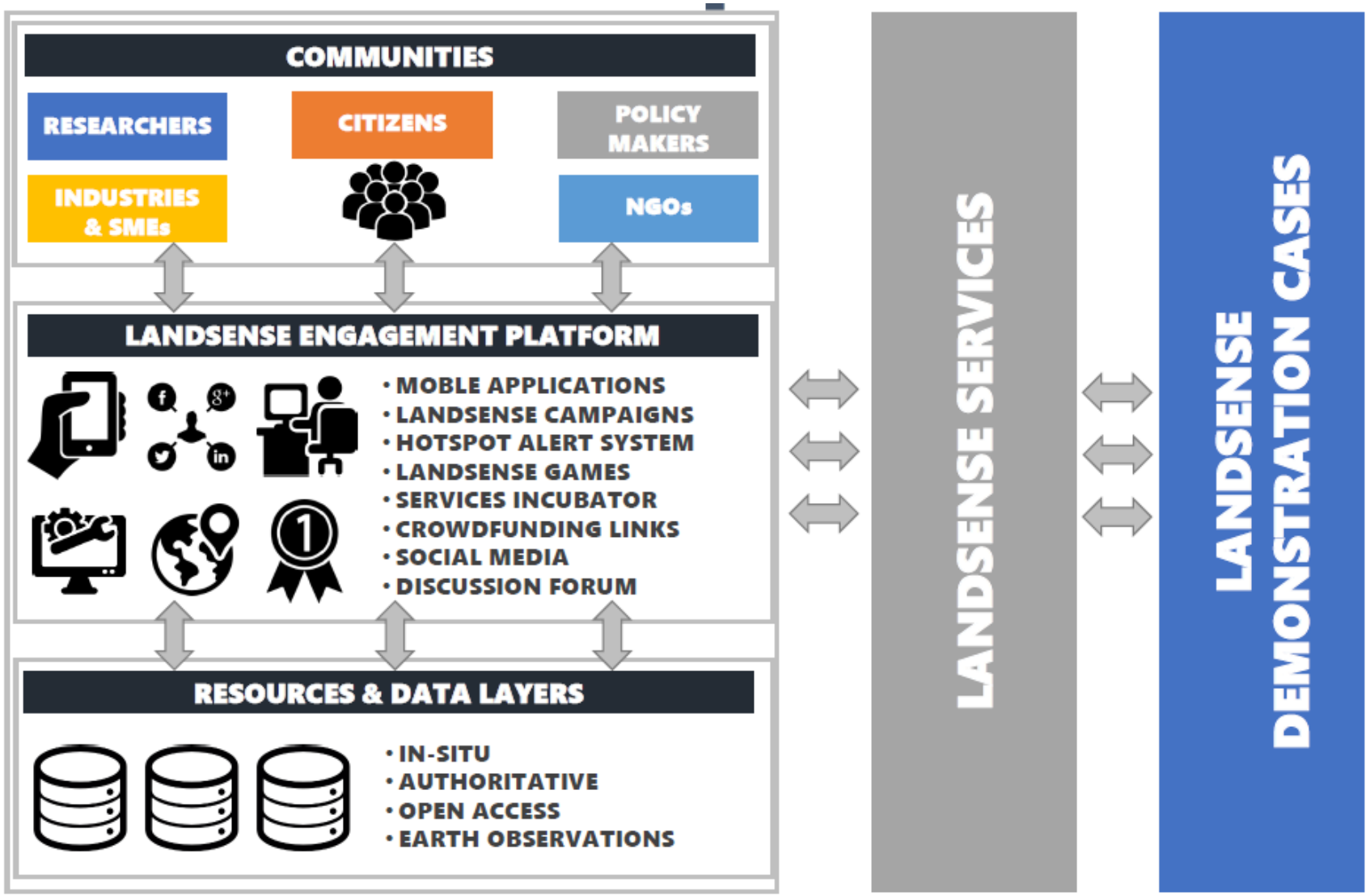


1. International Institute for Applied Systems Analysis
2. Birdlife International
3. Sinergise
4. University of Nottingham
5. InoSens doo
6. GeoVille Information Systems GmbH
7. Environment Agency Austria
8. Institut National de l'Information Géographique et Forestière
9. European Citizen Science Association
10. StZ Felis
11. University of Heidelberg
12. Wageningen University
13. VU University Amsterdam
14. Joint Research Centre
15. Secure Dimensions
16. Friends of the Earth/Global 2000
17. City of Heidelberg
18. KriticalMass

European Commission
Horizon 2020
European Union funding
for Research & Innovation

IGN

LANDSENSE ENGAGEMENT PLATFORM



https://lep.landsense.eu/

LANDSENSE ENGAGEMENT PLATFORM

- 4 SERVICES

LandSense Campaigner

Farmland Support

Change Detector

Quality Assurance & Control

- 3 DEMO CASES, 8 PILOTS

Urban & Rural Landscape Changes

France, Germany, Austria, and Netherland

Agricultural Land Use

Serbia

Habitat & Forest Monitoring

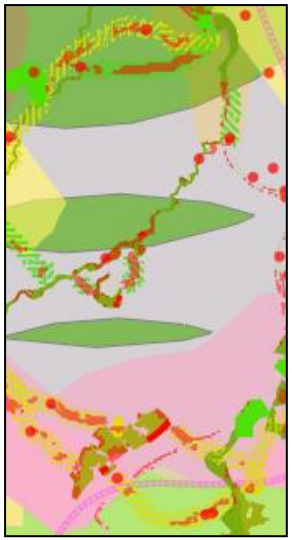
Spain, Indonesia

https://lep.landsense.eu/

IGN

IGN CONTEXT

- IGN produces The Large Scale reference system (RGE®) and LULC



- two attributes: LC and LU
- 17 LU classes
- 14 LC classes

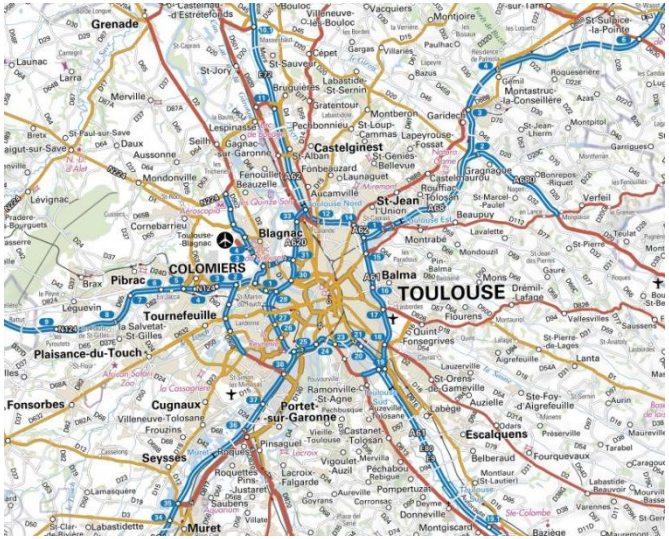
LULC (2016)

- Update policy : **cyclical** (every 3 years)
- Two dates : 2013, **2016**

IGN PILOT GOAL

- **Update, Improve, and Validate LULC**
  - Using mobile and web-based applications
  - Organising campaigns involving crowd and community sourcing
  - Using Change Detection and Quality Assessment services

- **Pilot : Toulouse and its surrounding areas**



- **Bundle of campaigns: 2018 to 2019**

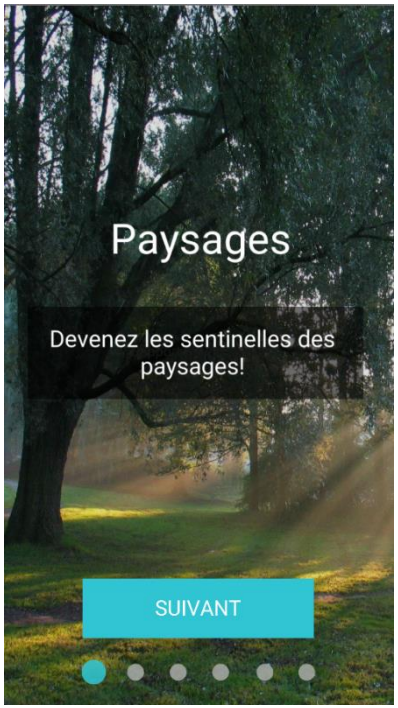
TOOLS TO CONTRIBUTE : PAYSAGES

THREE TOOLS TO CONTRIBUTE

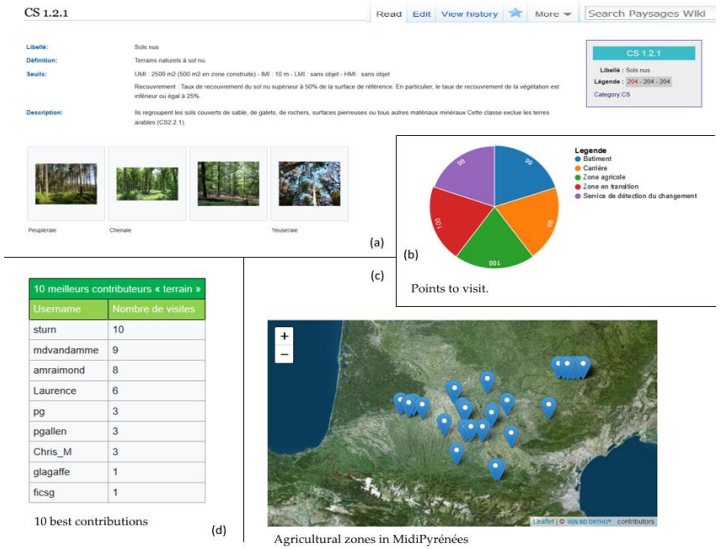
PAYSAGES web:
https://paysages.ign.fr/

- Collaborative mapping and validation : thematic and geometry information

PAYSAGES mobile:
(Android and Apple store)



PAYSAGES semantic wiki:



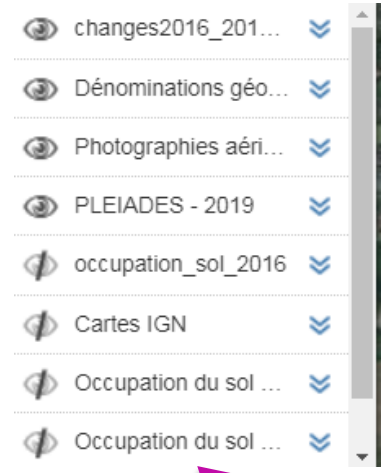
- Inform and help contributors
- Describe metadata

- Collaborative validation : thematic information
- *In-situ,* guided campaign

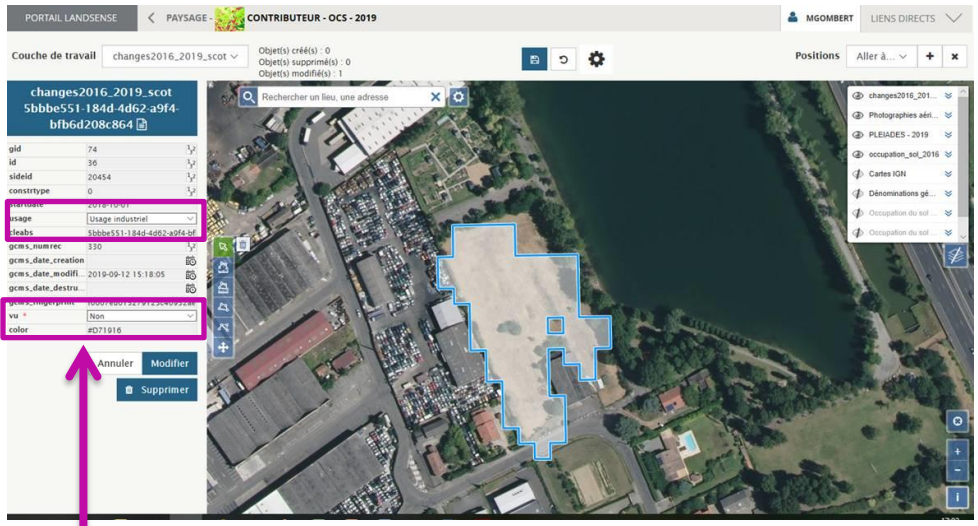
PAYSAGES: WEB APPLICATION

WMS

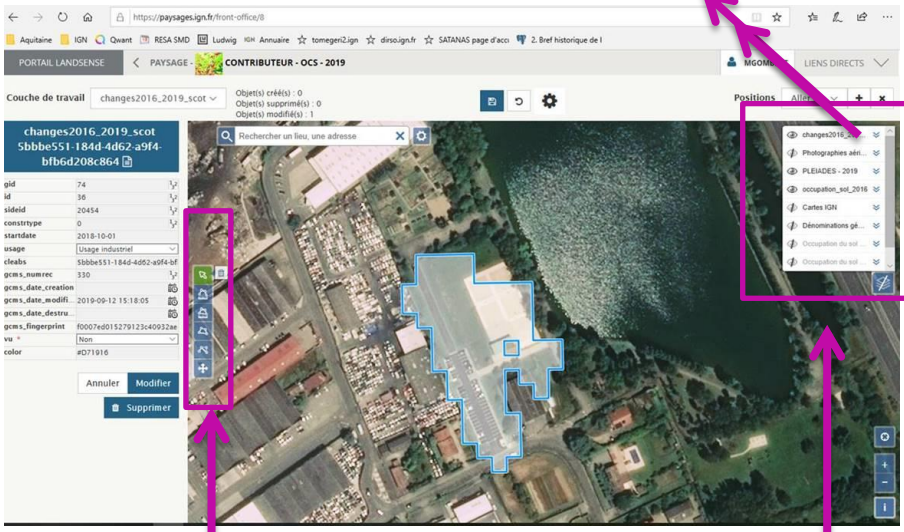
- FUNCTIONALITIES
  - Validation tasks
  - Attribute and Geometry edition
  - Data management: store, conflict, history



2016



2019



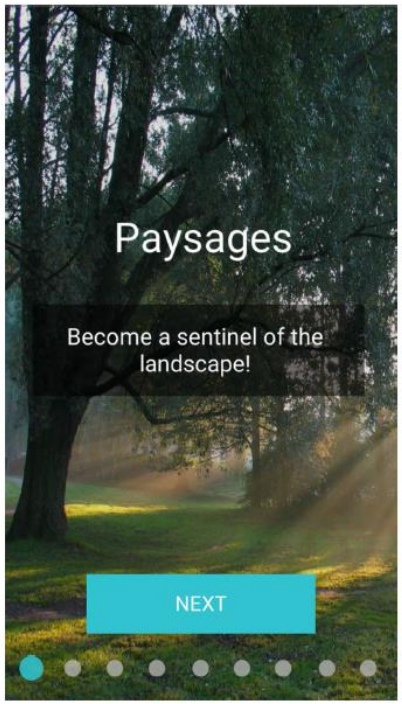
Attribute edition

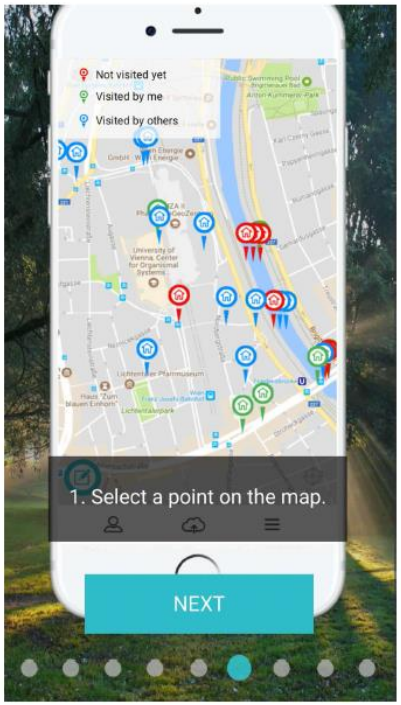
Geometry edition

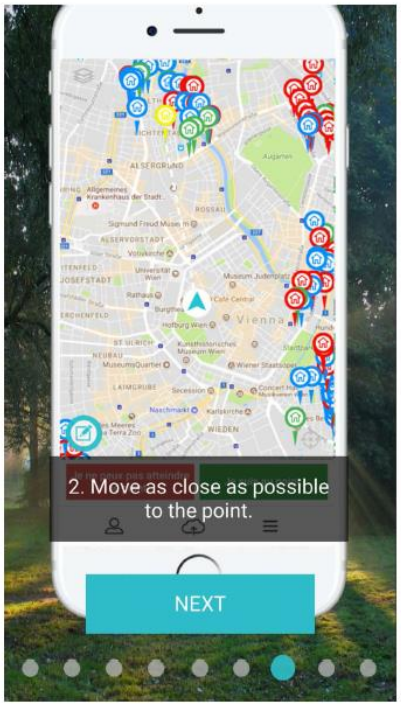
Validation layers

PAYSAGES: MOBILE APP

- **FUNCTIONALITIES**
  - Position and distance measures
  - Attributes edition and Validation tasks
  - Photos
  - Gamification







CAMPAIGNS

CAMPAIGNS

- **Goals**
  - LULC classification : LU 2 (Industrial), LU3 (Commercial), LU5 (Residential)
  - Change validation : changes detected by the change detection service from 2016-2019
- **Organise Maphatons: *in-situ* and *in front of the desk***
- **Targets: experts from local authorities, students, citizens**

CAMPAIGNS

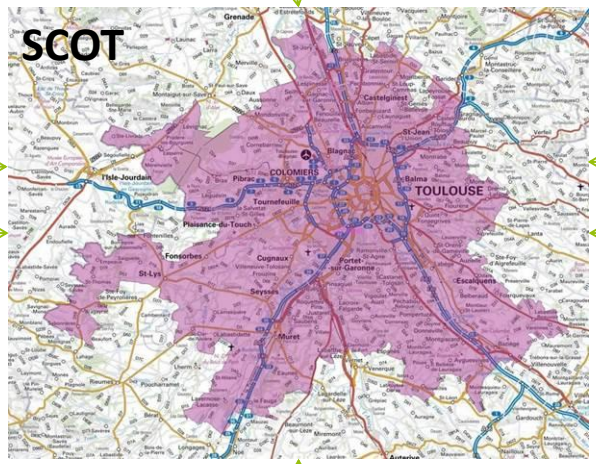
- 131 contributors
- 7000 observations
- 420+ in-situ photos

Campaign 1
- **LULC classification**
  - LULC 2016
- Target: **experts**
- **Paysage mobile**

Campaign 2
- **LULC classification**
  - LULC 2016
- Target: **citizens**
- **Paysage web**

Campaign 9
- **Change validation**
  - Changes from 2016-2019
  - LULC 2016
- Target: **expert**
- **Paysage mobile**

2019



Campaign 3 , 4, 5, 6
- **LULC classification**
  - Changes from 2016-2019
  - LULC 2016
- Target: **ENSG, experts**
- **Paysage web/Laco-wiki**

Campaign 7
- **LULC classification**
  - Changes from 2016-2019
  - LULC 2016
- Target: **citizens**
- **Paysage web**

Campaign 8
- **Validation changements**
  - Changes from 2016-2019
  - LULC 2016
- Target: **experts**
- **Paysage web**

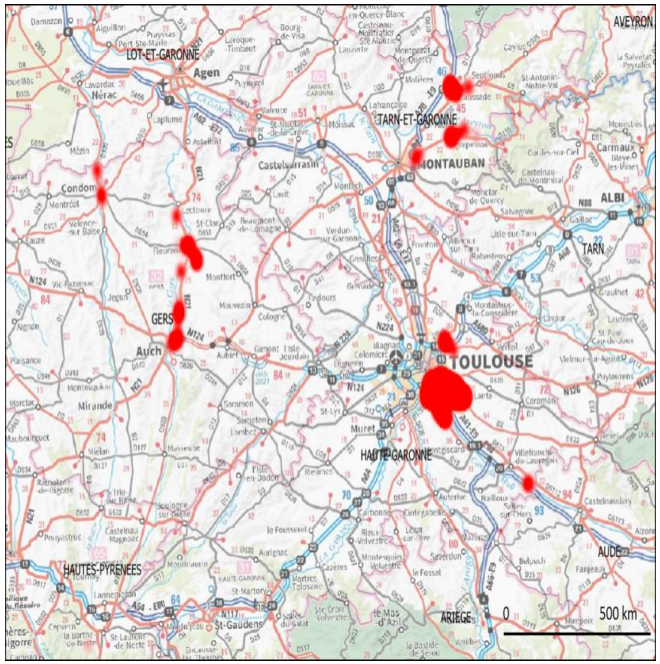
RESEARCH ASPECTS : USE OF COLLECTED DATA TO IMPROVE AND UPDATE LULC

QUALITY ASSESSMENT

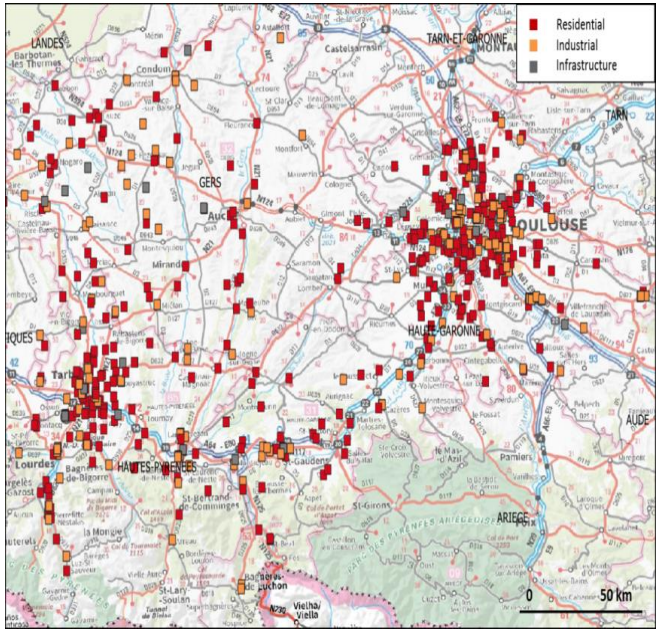
- **OBSERVATIONS:**
  - Contributor Agreement : Fleiss Kappa
  - Categorical accuracy : Confusion Matrix
  - Contributor’s profiles analysis

- **PHOTOS:**
  - Face detection and blurring
  - License plate detection and blurring
  - Blur and Illumination checking

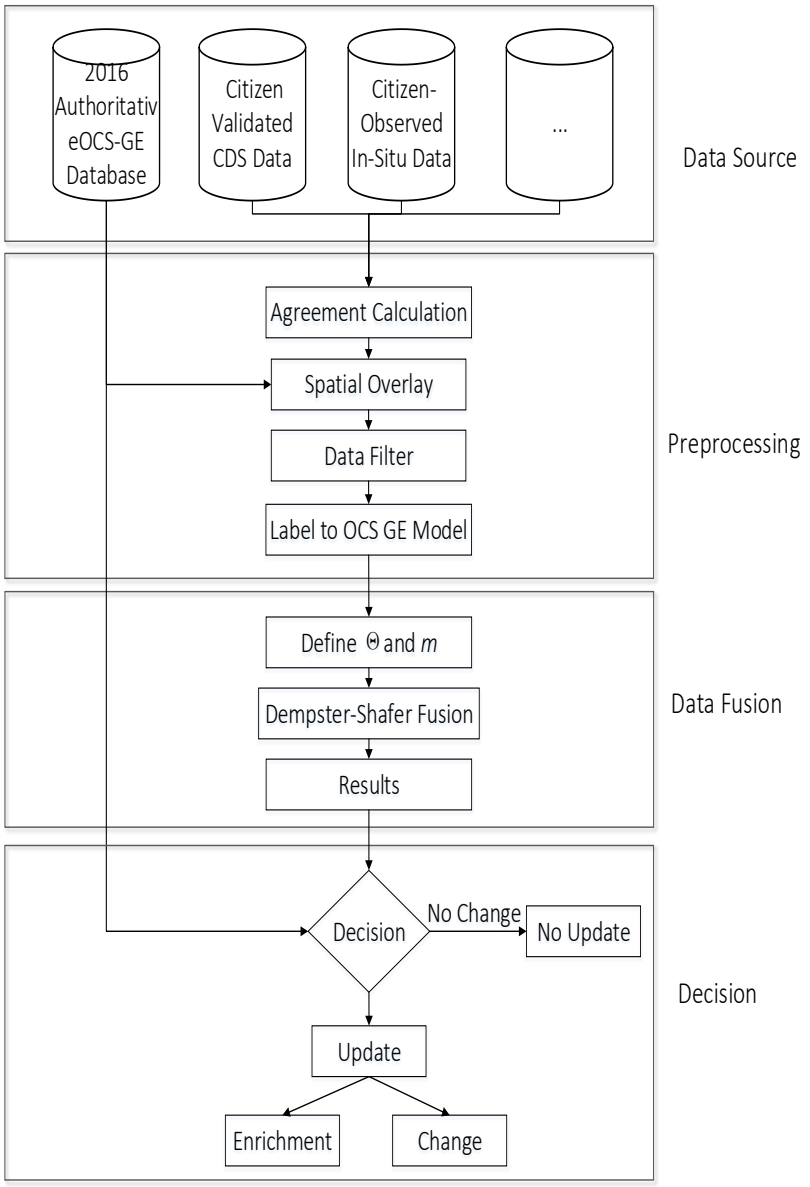
Workflow for integration of citizen-observed data in authoritative systems



In-situ citizen-observed data : changes occurred in authoritative LULC data

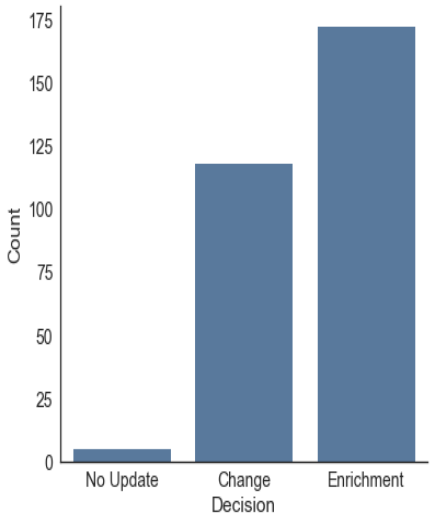


Validated changes coming from the Change Detection Service (CDS)

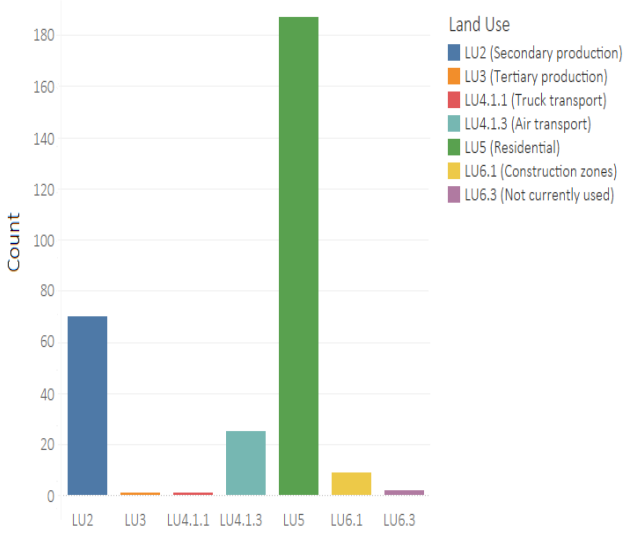


Workflows for integration of citizen-observed data in authoritative systems

The distribution of Dempster-Shafer derived solutions : in total, there are 295 LULC polygons concerned by changes in CDS and in-situ data



Distribution of updating decisions obtained by applying the proposed workflow



! Big potential of citizen-derived data to improve LULC authoritative data , one of the most relevant need expresed by LULC users

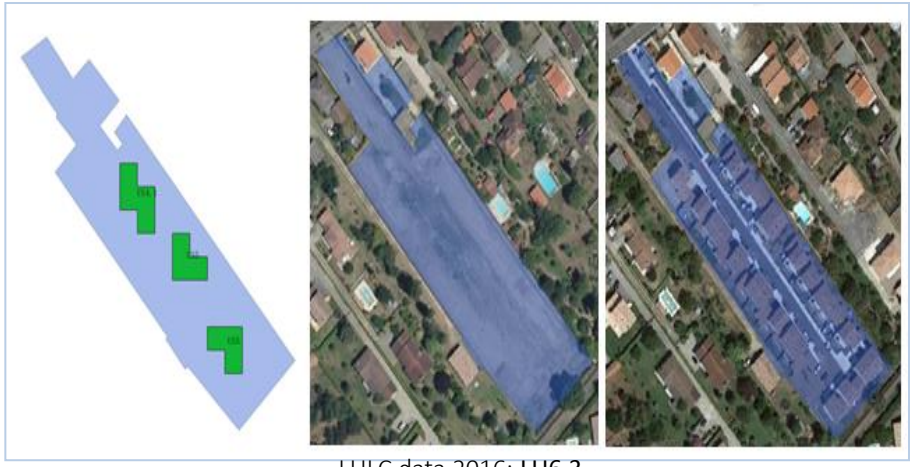
Example: Enrichement of LULC data

In-situ citizen-derived data

LULC data 2016: LU 235 (Industrial, Commercial, Residential)

Workflow results: LU 5 (Residential)

Example: Update of LULC data



Validated changes

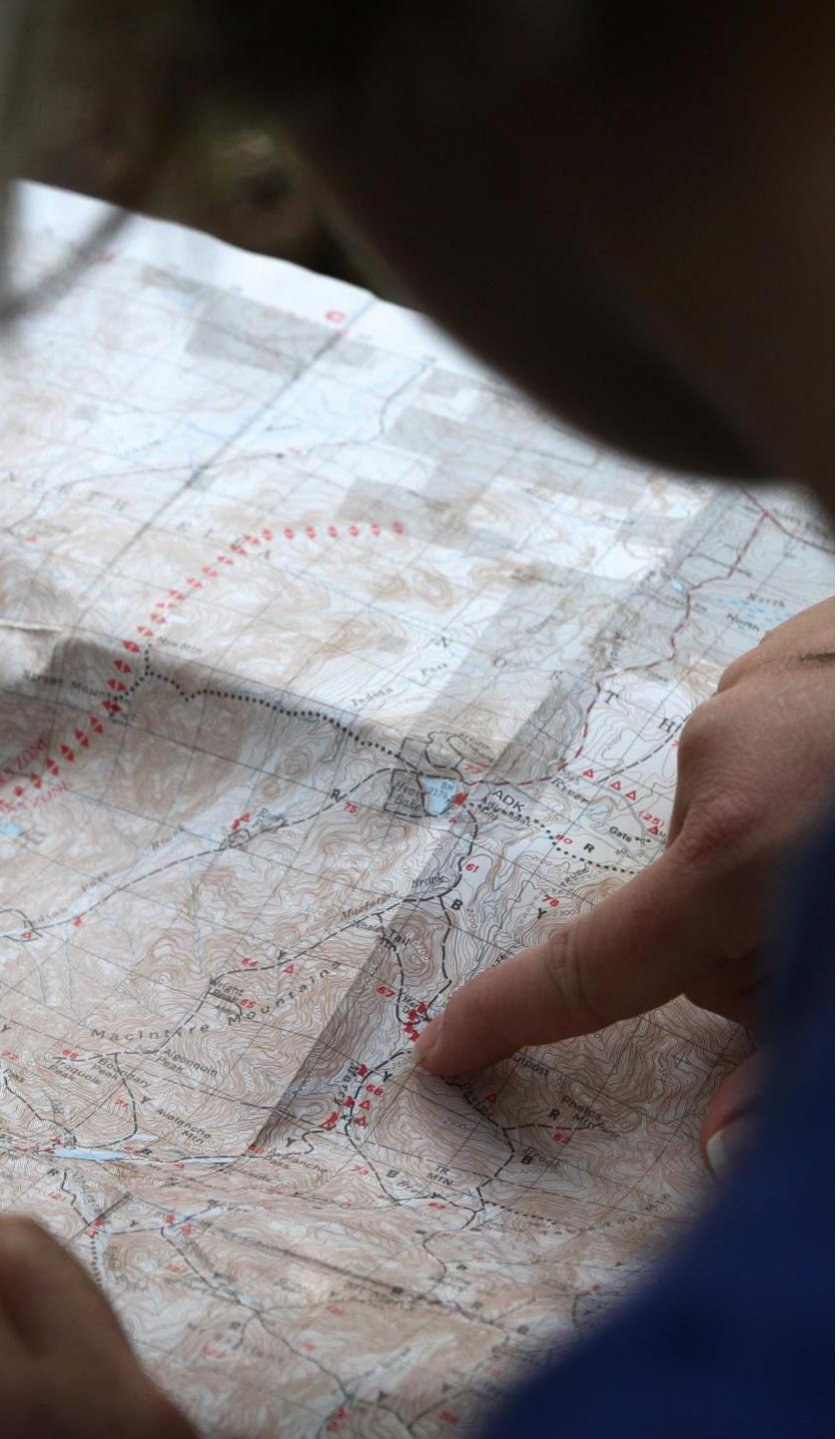
LULC data 2016: LU6.3 (Not currently used)

LULC data 2019
Workflow results: LU 5 (Residential)

LANDSENSE PILOT

Lesson learned

- Define and moderate the community is a difficult task, generally under estimated
- Motivation: Involve the potential contributors from the beginning : needs, tools functionalities, etc., build a win to win relationship
- Web and in-situ guided campaigns: found the optimal balance
- Big potential of citizen-derived data to improve LULC authoritative data, one of the most relevant need expresed by LULC users

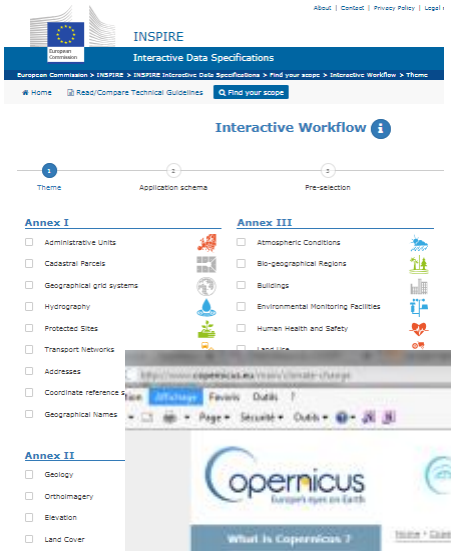


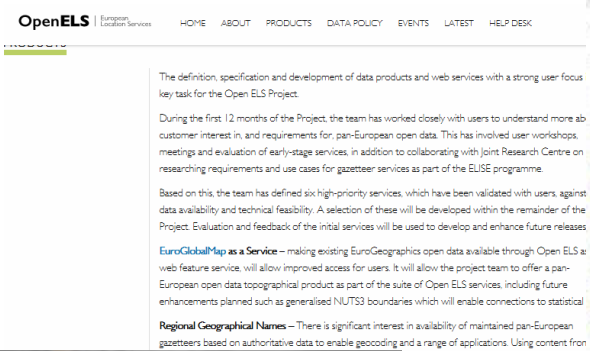
Outline

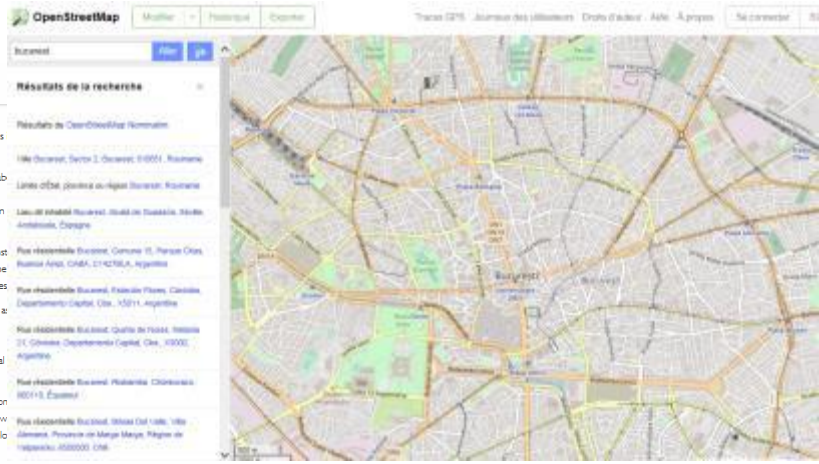
- The new collaborative eco-system at IGN
- Crowd and community pilot: LandSense project
- Infolabs: Urclim project

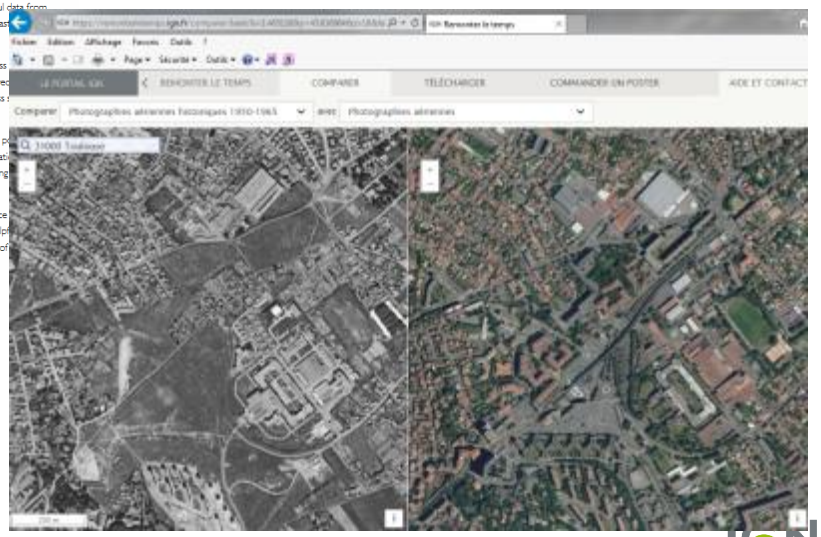
CONTEXT: USER ACCESS TO GEOGRAPHICAL DATA

- E.G. : « DATA ABOUT GREEN SPACES IN CITIES… »









USER ACCESS TO GEOGRAPHICAL DATA

Lots of sources and criteria to consider :

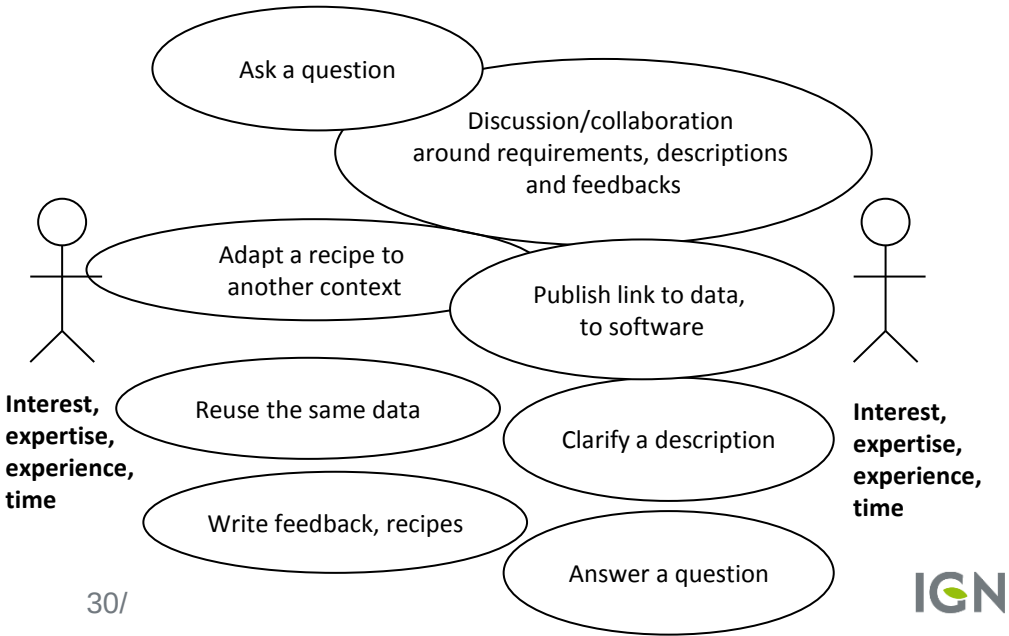
- *Different technos and funding programs*
- *Different kinds of uncertainties to consider*
- *Different kinds of « costs »*
- *Need to access also software to pre-process the data to feed user application*

Need for a dynamic solution and not one shot analysis (because fast evolving context, new data, new data products, new portals, new licences… new processing methods…)

Portals and catalogues still in silos (techno, funding program, coverage, community,..), no solution for user-oriented discovery and comparison of solutions

THEMATIC INFOLABS

- **A thematic Infolab : a social network supporting dynamic user access to geographical data across technological and community silos**
  - Focused on user access to geodata on a given application domain (ex: urbanism, mobility, migration, climate) analyse what metadata are missing and how to collaboratively acquire them
  - Participants/contributors: users with different levels of expertise and experiences, data specialists, software developers, etc.

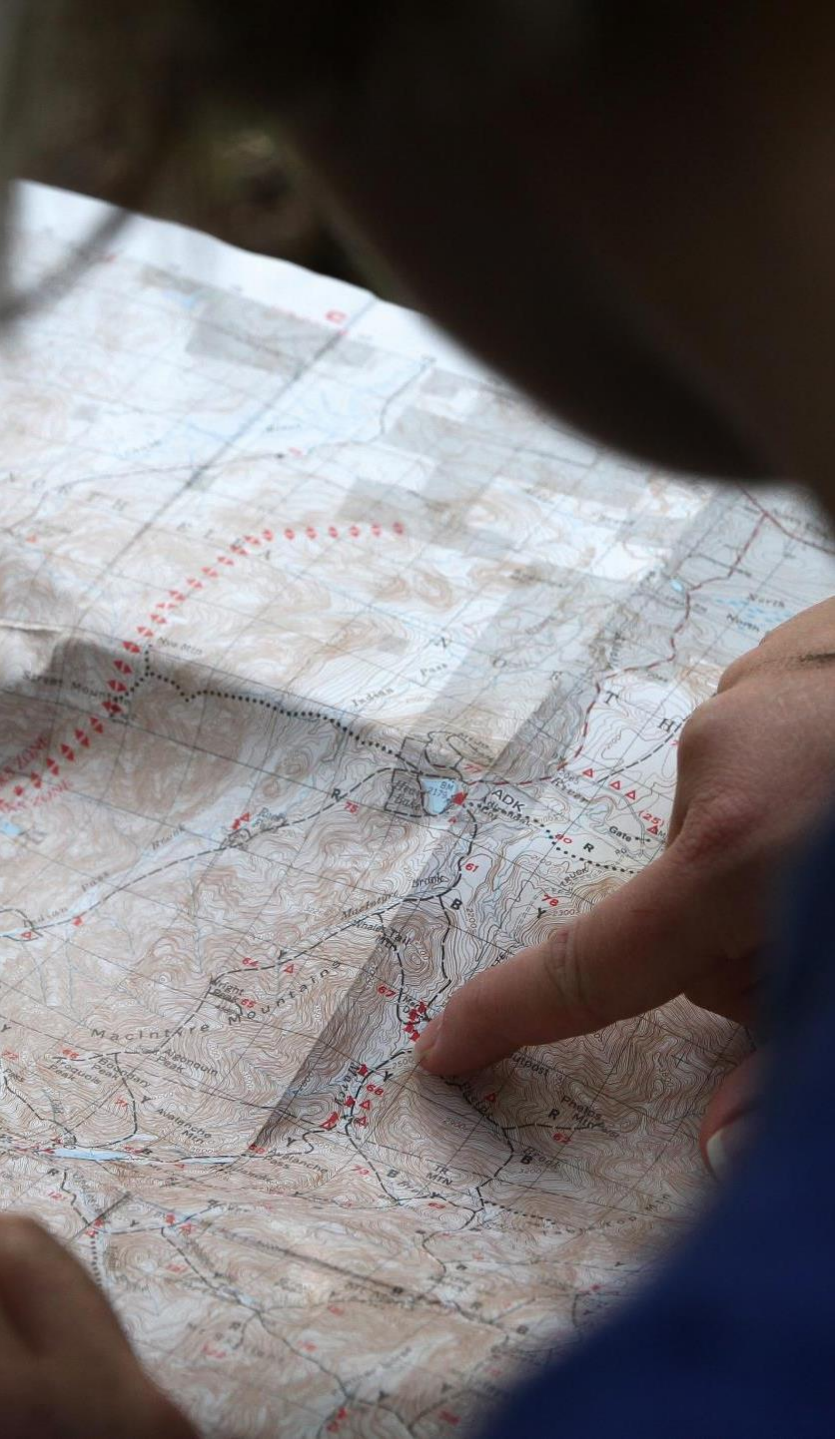


GEOMETADATALABS.EU : A HUB FOR INFOLABS

- **Platform operated by EuroSDR, connecting european geodata providers to different applications-focused infolab**

- **Application for the 1st prototype of infolab : Urban CLIMATE scientists (URCLIM)**

- **First findings: important metadata are**
  - The vocabularies, schemas, taxonomies, etc used in the domain and in the sources
  - Propose sample data
  - Describe usage of software rather than software
  - Build connections between similar data



INSTITUT NATIONAL
DE L'INFORMATION
GÉOGRAPHIQUE
ET FORESTIÈRE

Thank you !!

European Commission

Horizon 2020
European Union funding
for Research & Innovation

QUESTIONS ?

- **Collaborative strategy at IGN**
  - Contact : Yolène Jahard (yolene.jahard@ign.fr)
- **InfoLabs**
  - Contacts : Bénédicte Bucher (benedicte.bucher@ign.fr) and Marie-Dominique Van Damme (marie-dominique.vandamme@ign.fr)
- **LandSense**
  - Contacts : Ana-Maria Raimond (ana-maria.raimond@ign.fr) and Marie-Dominique Van Damme (marie-dominique.vandamme@ign.fr)

- Bucher B., Van Damme M.-D., 2018, URCLIM Deliverable D2.1-1, URCLIM Infolab
- Bucher, B., Tiainen, E., Ellett von Brasch, T., Janssen, P., … , M., 2020, “Conciliating perspectives from mapping agencies and Web of data on successful European SDIs: towards a European Geographic Knowledge Graph”, in SDI and the Revolutionary Technological Trends, IJGI, to be published
- Olteanu-Raimond, A.-M., L. Jolivet, M.-D. Van Damme, T. Royer, F. Ludovic, L. See, T. Sturn, M. Karner, I. Moorthy and S. Fritz (2018) An Experimental Framework for Integrating Citizen and Community Science into Land Cover, Land Use, and Land Change Detection Processes in a National Mapping Agency, *Land*, vol. 7, n. 3, doi:doi:10.3390/land7030103, Domaine: Science de l’information géographique, Répertoriée : Scopus, Web of Science, IF : 1.44.