I Cammini della Regina

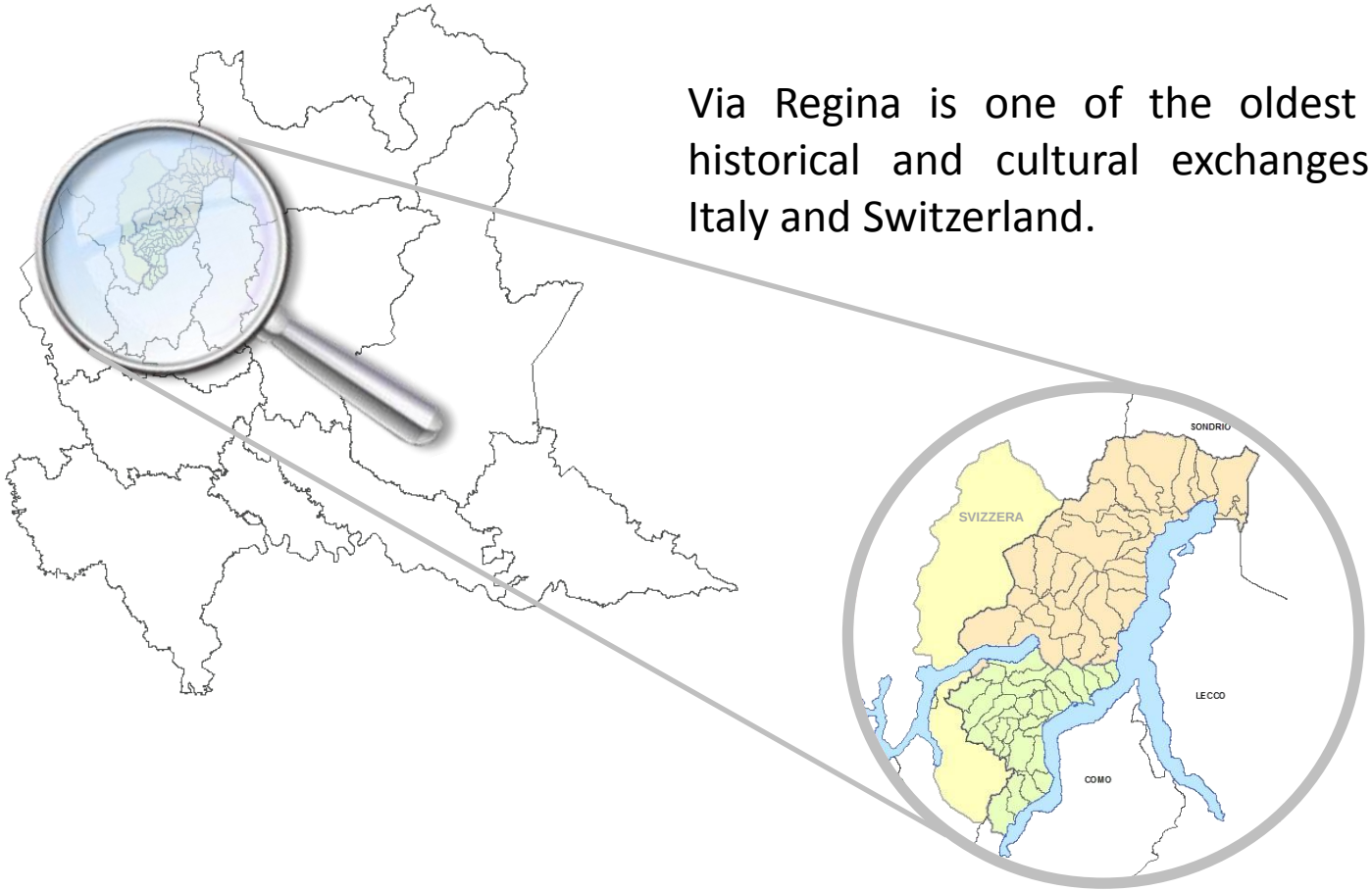
Percorsi transfrontalieri legati alla Via Regina

Maria Antonia Brovelli, **Alba Lucchese**, Marco Minghini, Marco Negretti, Giorgio Zamboni
Laboratorio di Geomatica del Politecnico di Milano - Polo Territoriale di Como

GFOSS Bologna, 11 Ottobre 2013

Le opportunità non hanno confini

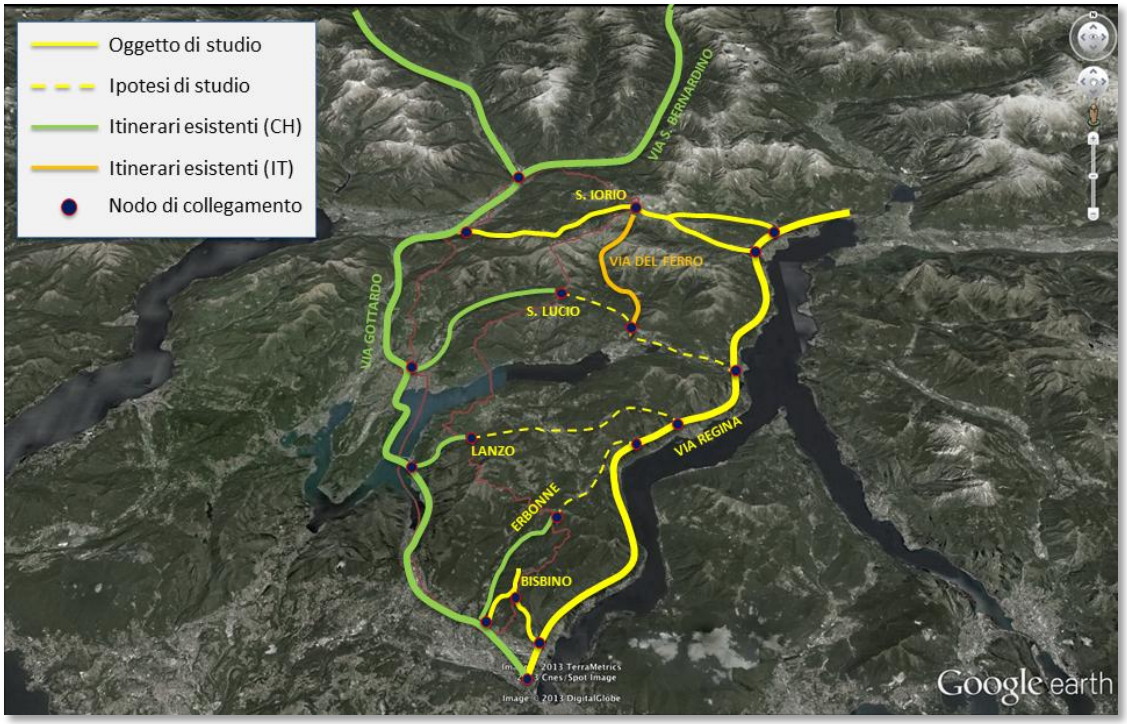
Project context



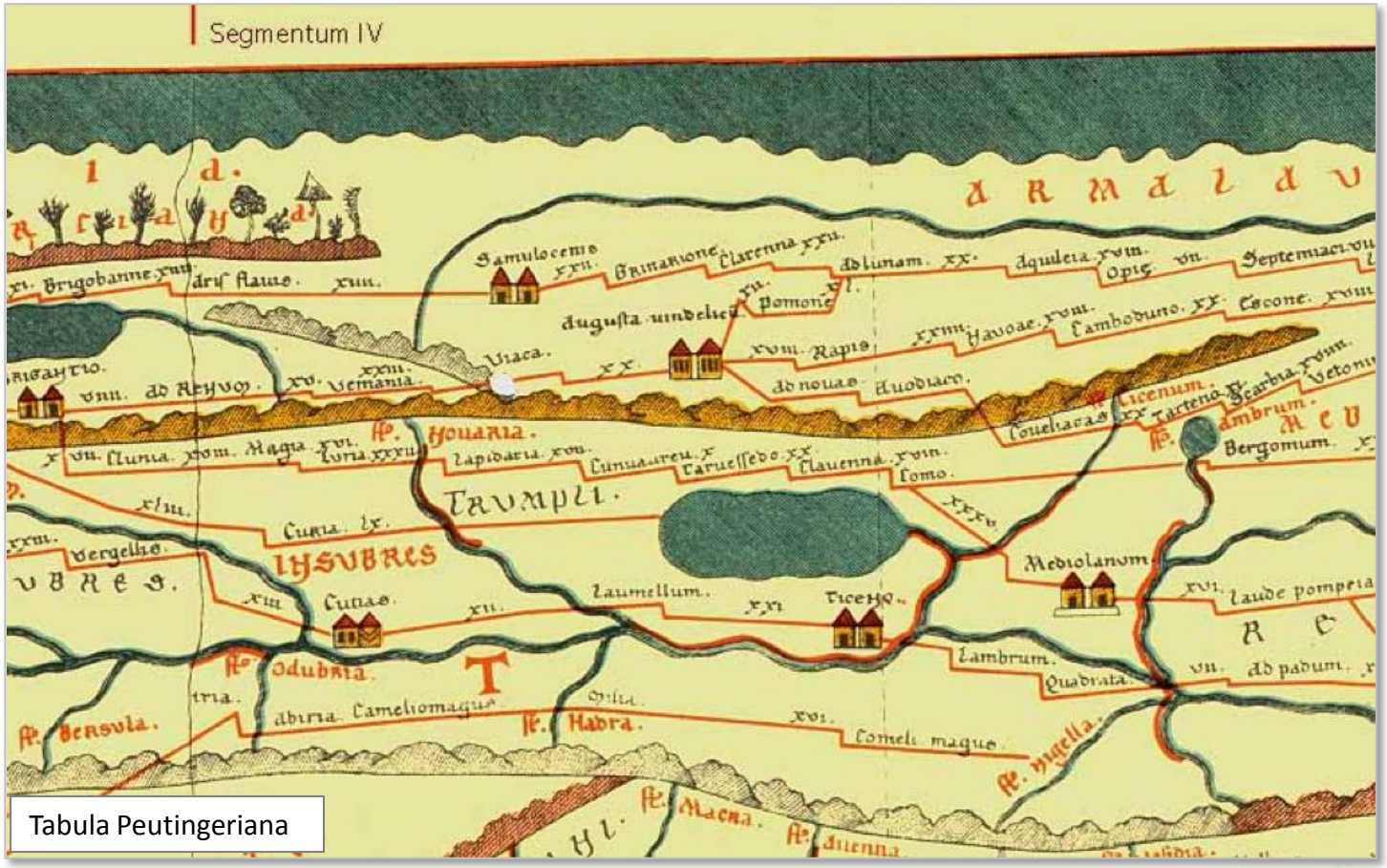
Via Regina is one of the oldest paths for historical and cultural exchanges between Italy and Switzerland.

Project context

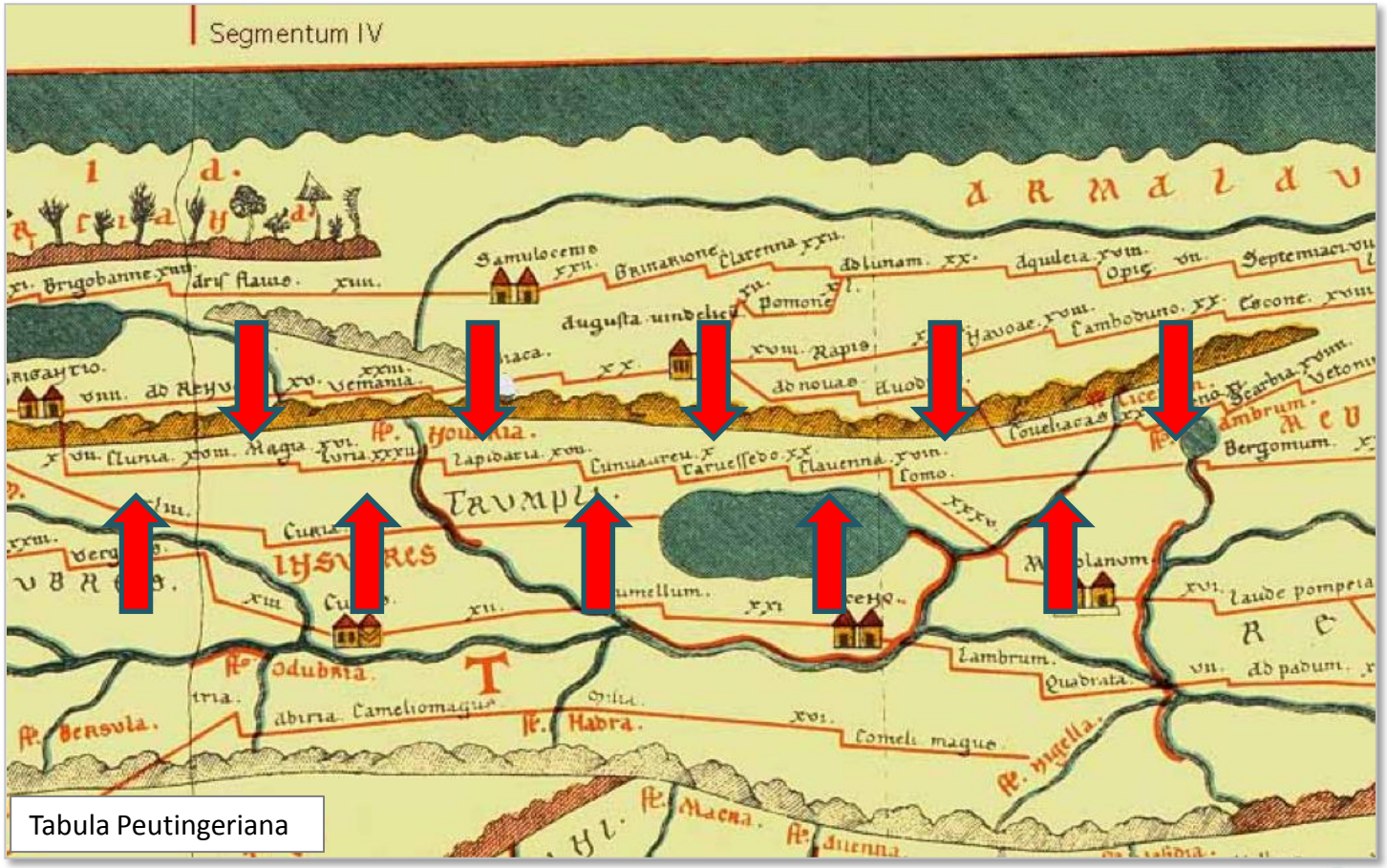
Beautiful walking route along Via Francisca and the Italian-Swiss Via Spluga, with which it forms a continuum, it is a fundamental transalpine system of soft mobility, whose potentials for a European development have not been adequately grasped so far.



Project context



Project context



Partners

UNIVERSITIES

- Politecnico di Milano – Como Campus
- Politecnico di Milano Foundation
- University of Pavia

ASSOCIATIONS

- Association Iubilantes

LOCAL ADMINISTRATIONS

- City of Cernobbio
- Mountain Community Lario Intelvese
- Mountain Community Valli del Lario e del Ceresio
- Consortium Frazioni Corti Acero

UNIVERSITIES

- Scuola Universitaria Professionale della Svizzera Italiana

LOCAL ADMINISTRATIONS

- Office of Cultural Heritage of Canton Ticino

Objectives of Via Regina project

❖Valorization of the territory and cultural heritage through preservation of historical paths

❖Use of geospatial technology for the dissemination of knowledge, protection of natural resources and tourism promotion thanks to the environmental and cultural wealth of the territory

❖Development and implementation of innovative technological tools such us:

- participatory GIS;
- multidimensional visualization;
- augmented reality.

First steps

1. Collection and analysis of existing data
2. Definition of the methodology for the study and enhancement of historical and cultural paths
3. Definition of the standard and technological solutions for web-services and visualization client
4. Applications for populating the database

Collection and analysis of existing data

UNIVERSITIES

- Digital Terrain Models (DTMs)

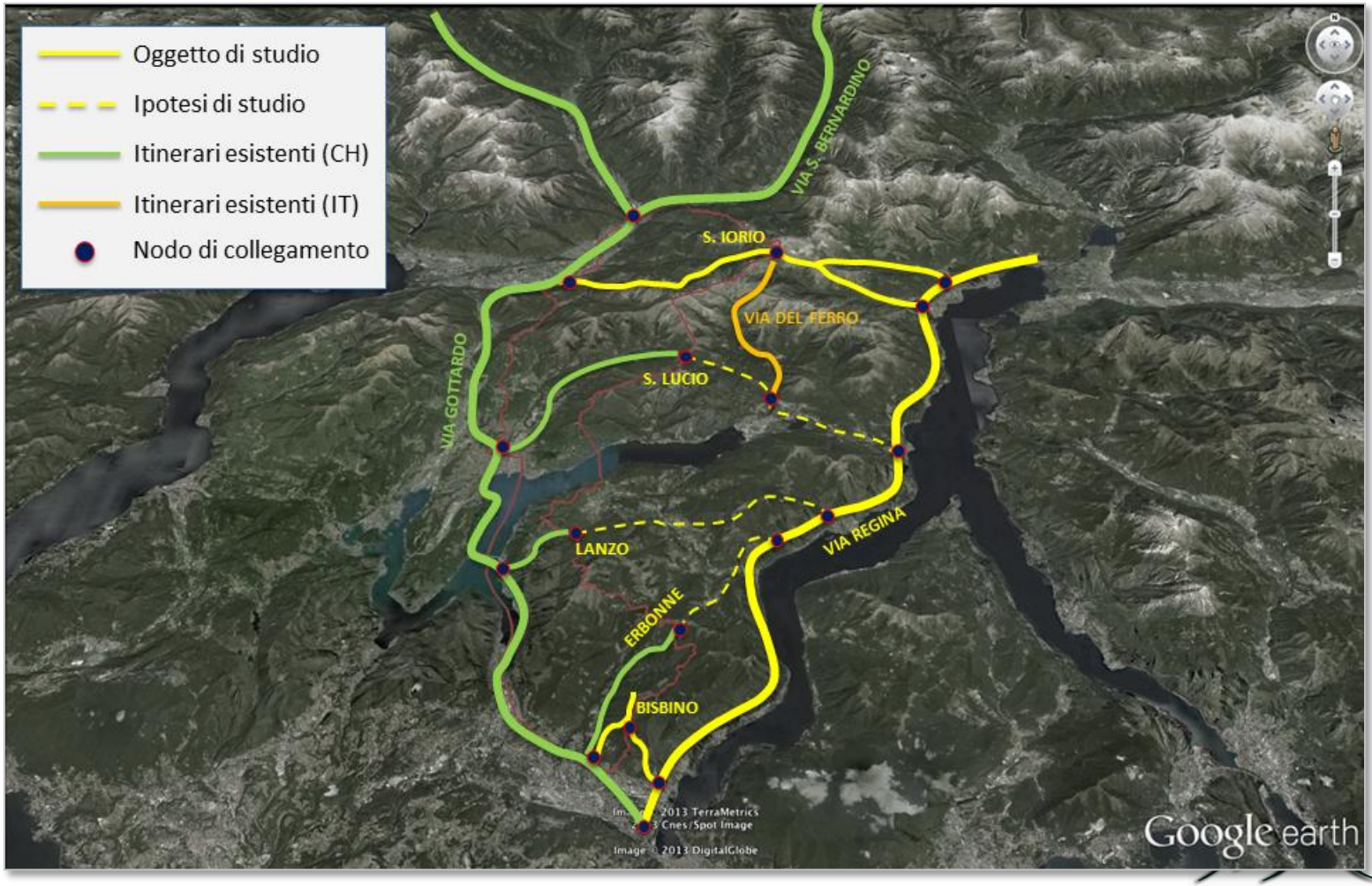
ASSOCIATIONS

- Paths and points of interest

LOCAL ADMINISTRATIONS

- Photogrammetric surveys
- Topographic Data Bases
- Maps of paths network
- Maps of thematic paths
- Regional Technical Map (CTR)
- Digital Terrain Models (DTMs)

Definition of the methodology: Paths identification



Definition of the methodology: Collect data form

Historical and cultural element	museum	etnography, tematic, gallery collezion
	religious buildings	church, oratory, sanctum, cappella, fresco, cross
	civil buildings	historical building, contemporary building , military building, monument
	rural buildings	snow deposit, alpeggio, aqueduct
	factory	furnace, mill, sawmill, mallet, quarry, mine

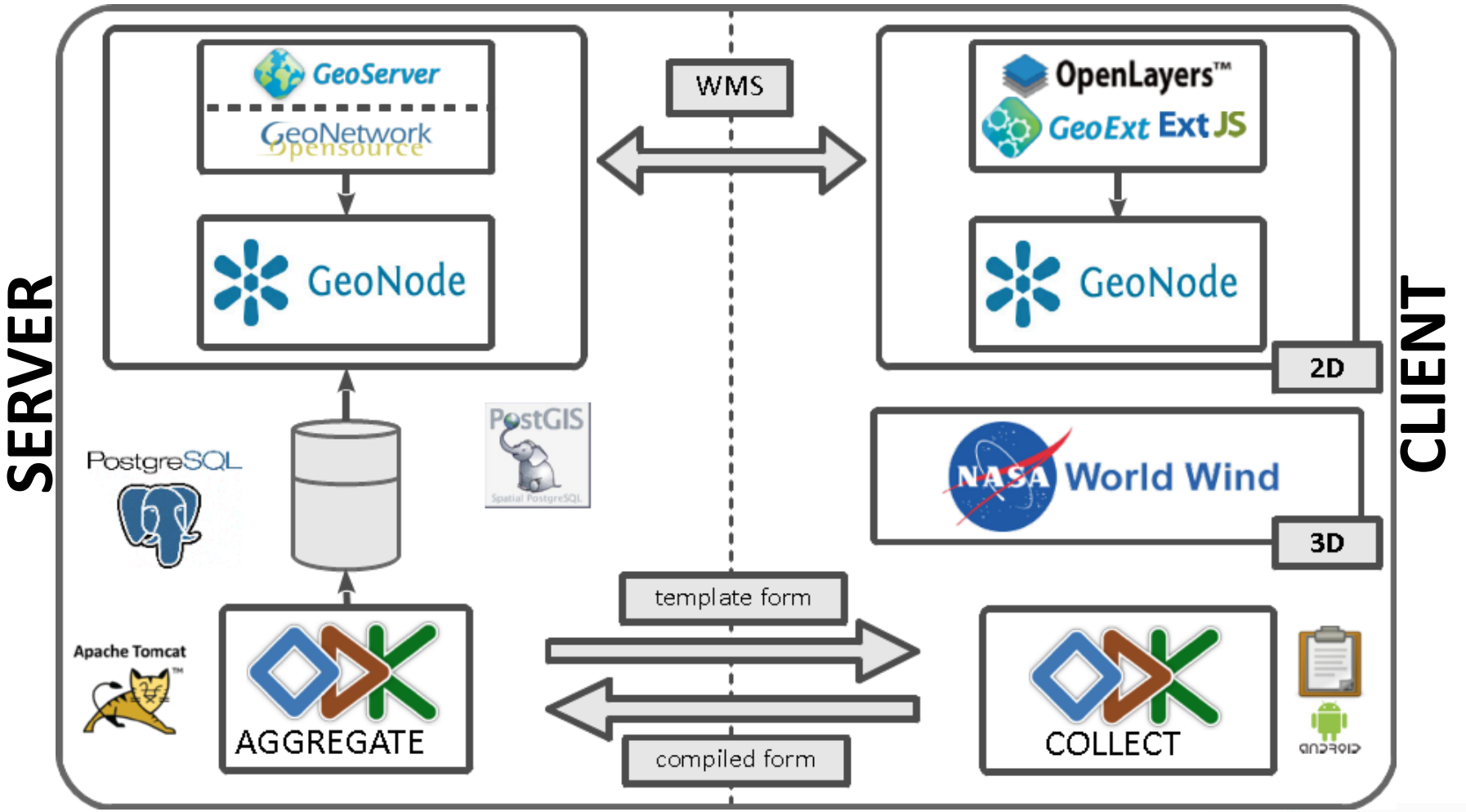
Definition of the methodology: Collect data form

Tourist element	accomodation and overnight	albergo, ostello, B&B, capanna, rifugio, campeggio, appartamento, agriturismo
	services and transport	fermata bus, attracco, stazione ferroviaria, stazione funicolare, impianto di risalita, bike, sharing, punto ricarica auto, posta, bancomat, info-point, wifi-hotspot, traghetto, segnaletica escursionistica
	products and food service	wine shop, clothing shop, food shop, crafts restaurant, bar, grotto

Definition of the methodology: Collect data form

Morphological element	surface	rock, natural material, gravel, pavement, asphalt, steps, ford
	bounding escarpment	ground escarpment, rock escarpment, support wall, parapet, tree-lined avenue, vertical plate, fence
	traffic support, manufactured product and panoramic viewpoints	kilometric stone, border stone, isolated tree, inscription, source, bridge, rest of bridge, sewer, panoramic viewpoint, tunnel

Hypothesis of Architecture



Applications for populating the database

GeoNode

DESKTOP

Upload vector (shapefiles) and raster data (GeoTIFF) in their original projections using a web form.

OPEN DATA KIT

MOBILE

ODK Build: graphical drag-and-drop tool for creating simple forms.
ODK Collect: Android app for filling forms.
ODK Aggregate: repository of the data sent by ODK Collect.

Participatory GIS

Proliferation of mobile devices equipped with sensors (GPS, camera, etc.)

Users can easily perform real-time collection of georeferenced data

- GIS as a tool for promoting citizens' intervention in decision-making processes
- Web-based applications allowing maps mash-ups, content upload and editing

Participatory GIS - required functionalities

- Data description
  - information should be described with a standard language comprehensible to everyone (e.g. GML, KML, NetCDF, CityGML, WaterML)
- Data sharing
  - information should be made available through standard protocols in order to be widely accessed from different client applications (e.g. WMS, WFS, WCS)
- User administration
  - systems should manage multiple user profiles and their related privileges
- Mash-up
  - maps coming from different sources should be directly overlapped in order to automatically integrate multiple information referred to the same context
- Data editing
  - users should be able to manipulate (e.g. insert, update, delete) geographical features through standard common interfaces

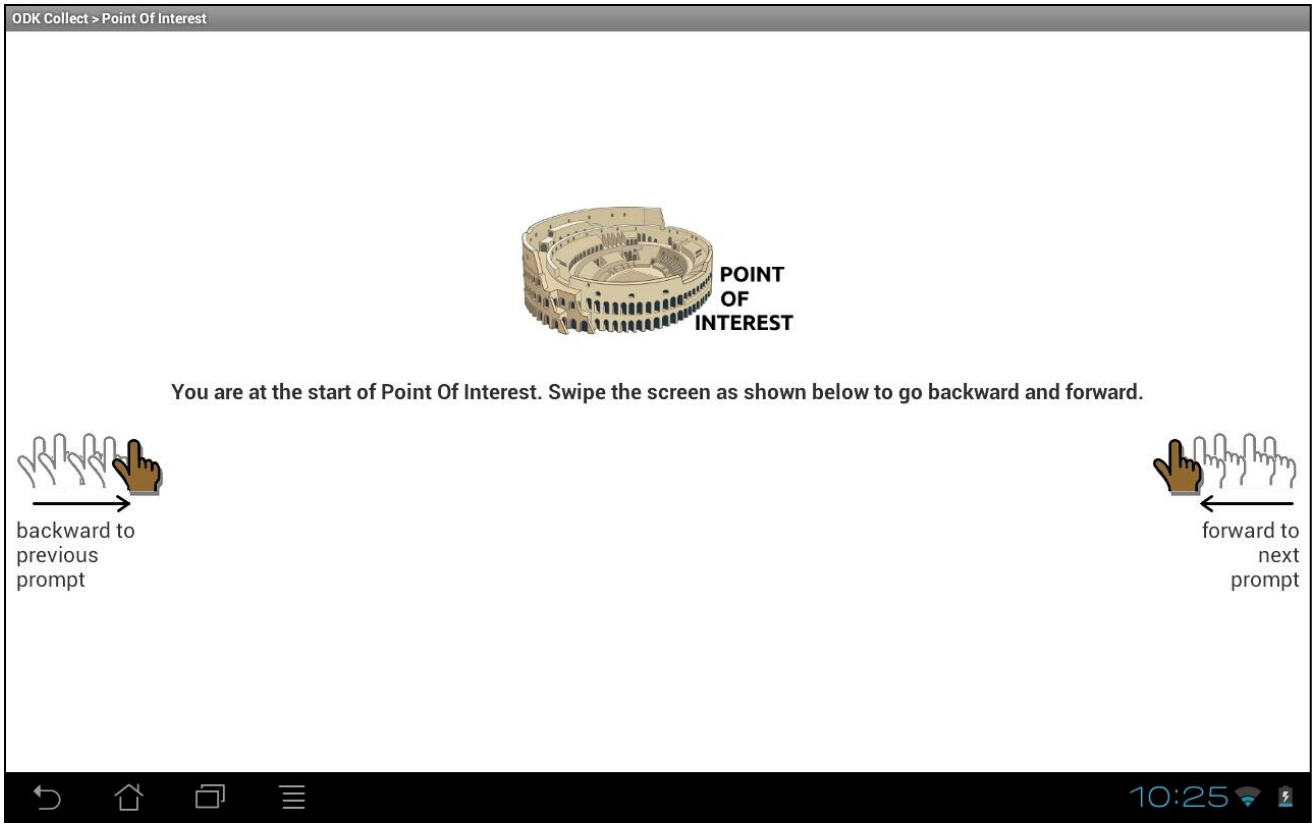
Previous experience

POINT OF INTEREST

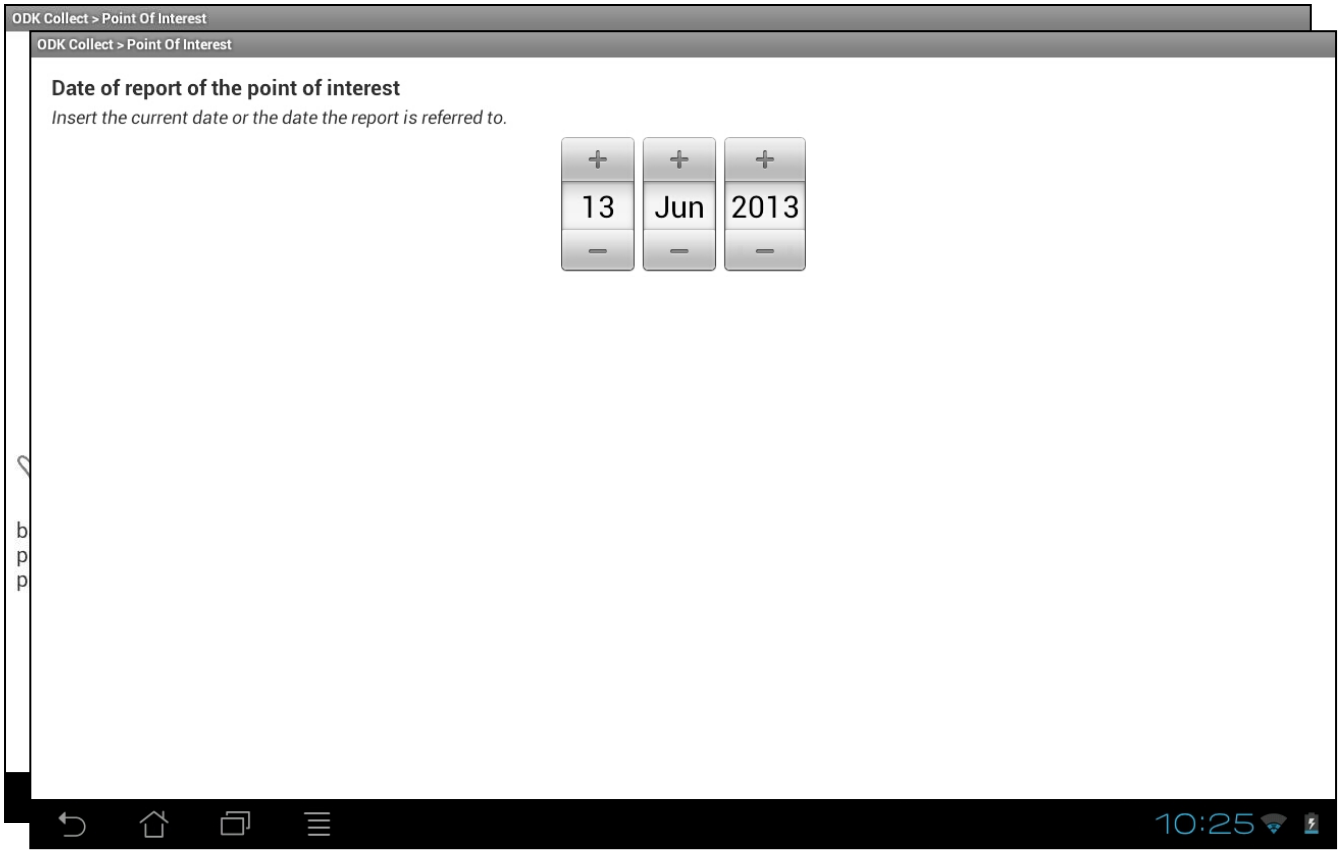
ARCHITECTURAL BARRIERS

ROAD PAVEMENT DAMAGES

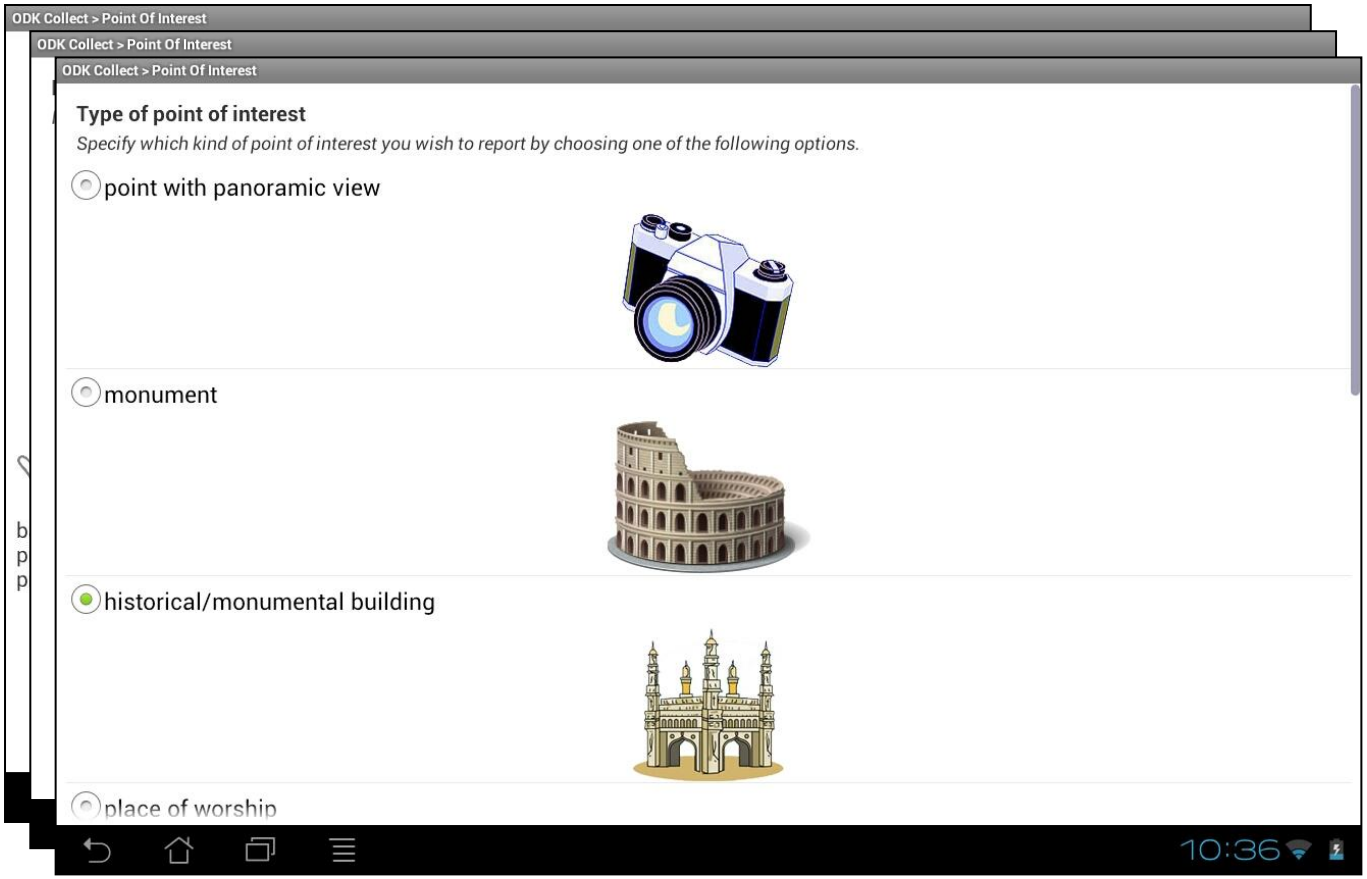
Example of data collection: Point of interest



Example of data collection: Point of interest

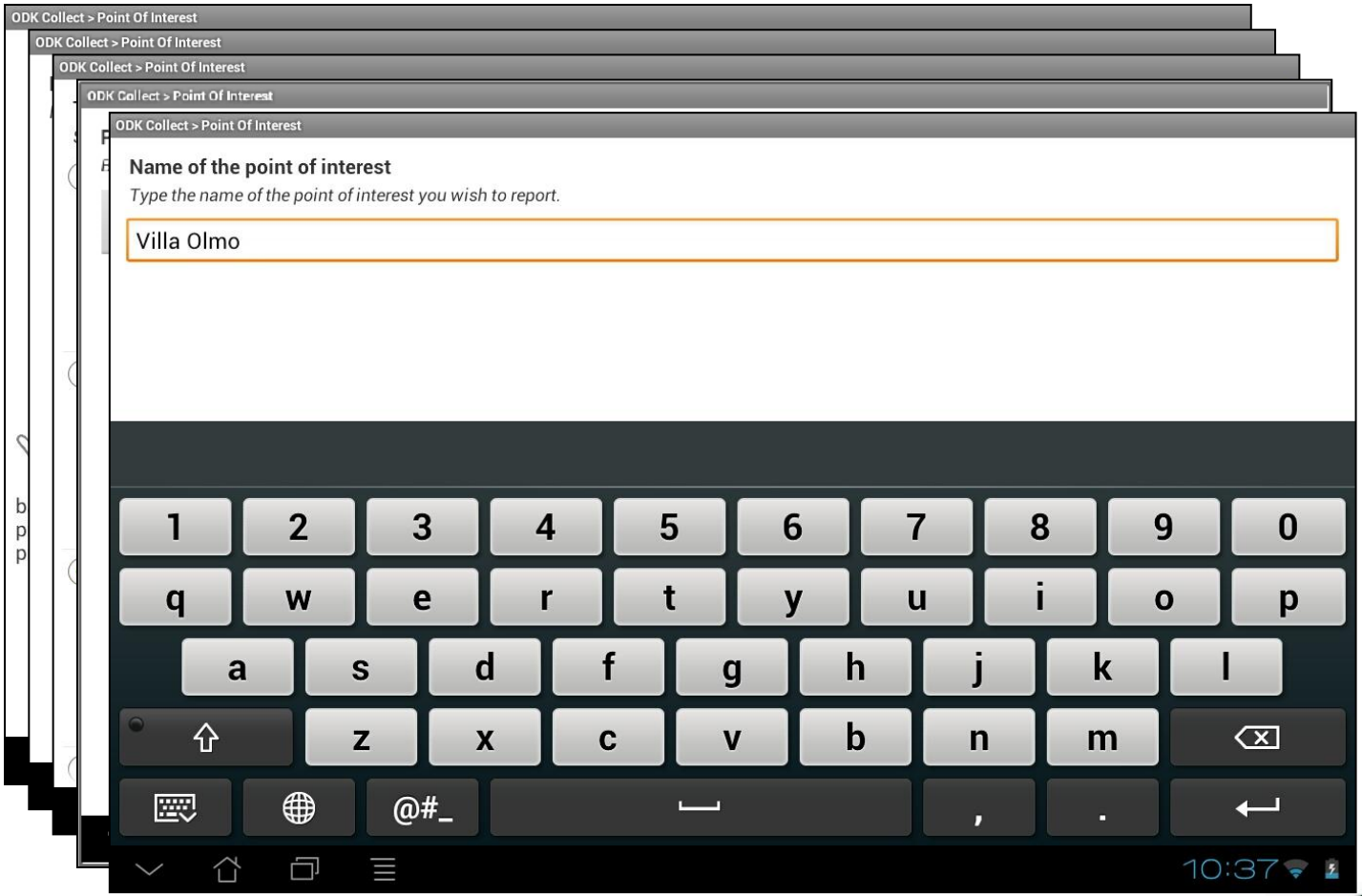


Example of data collection: Point of interest

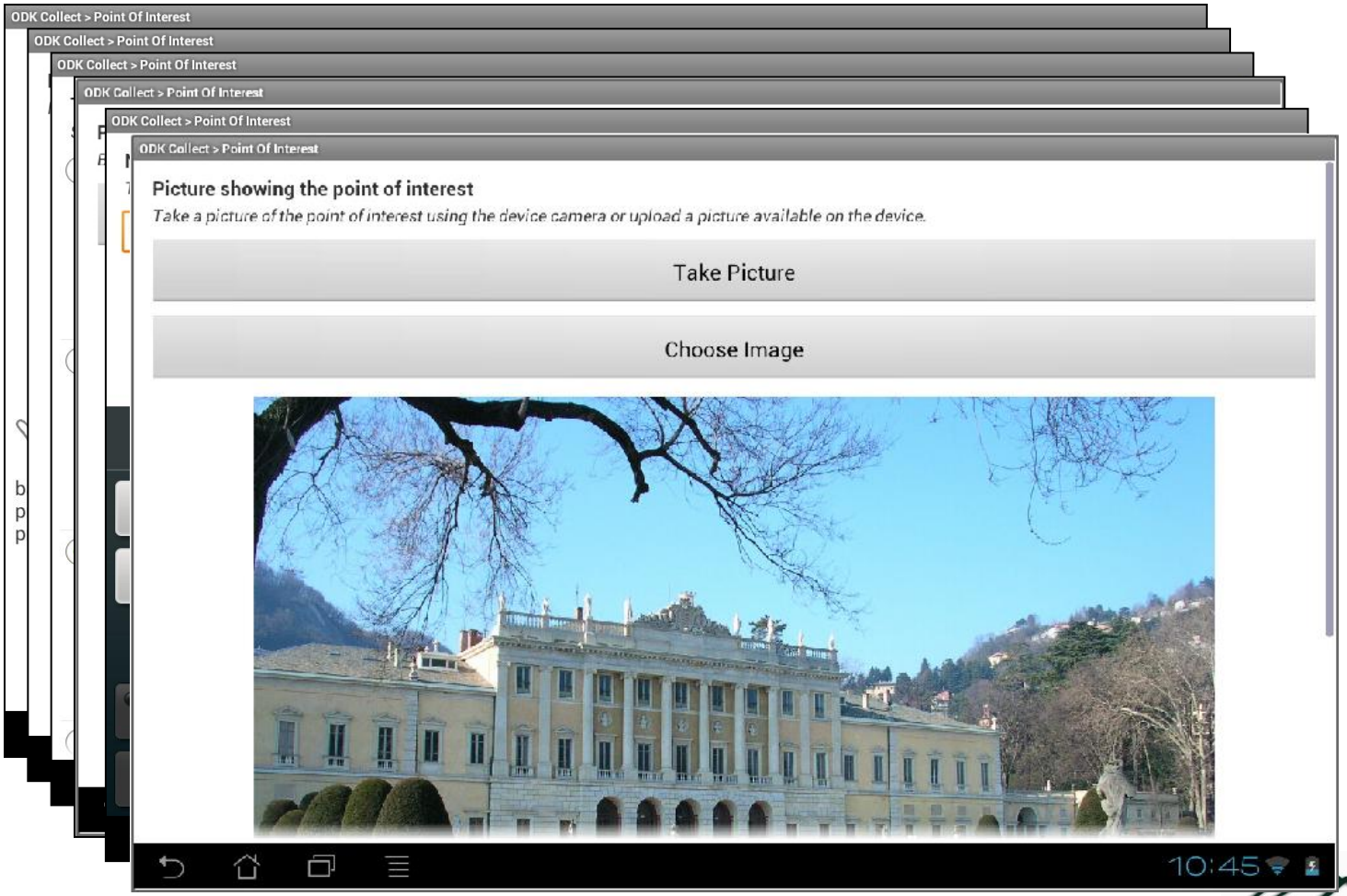


Example of data collection: Point of interest

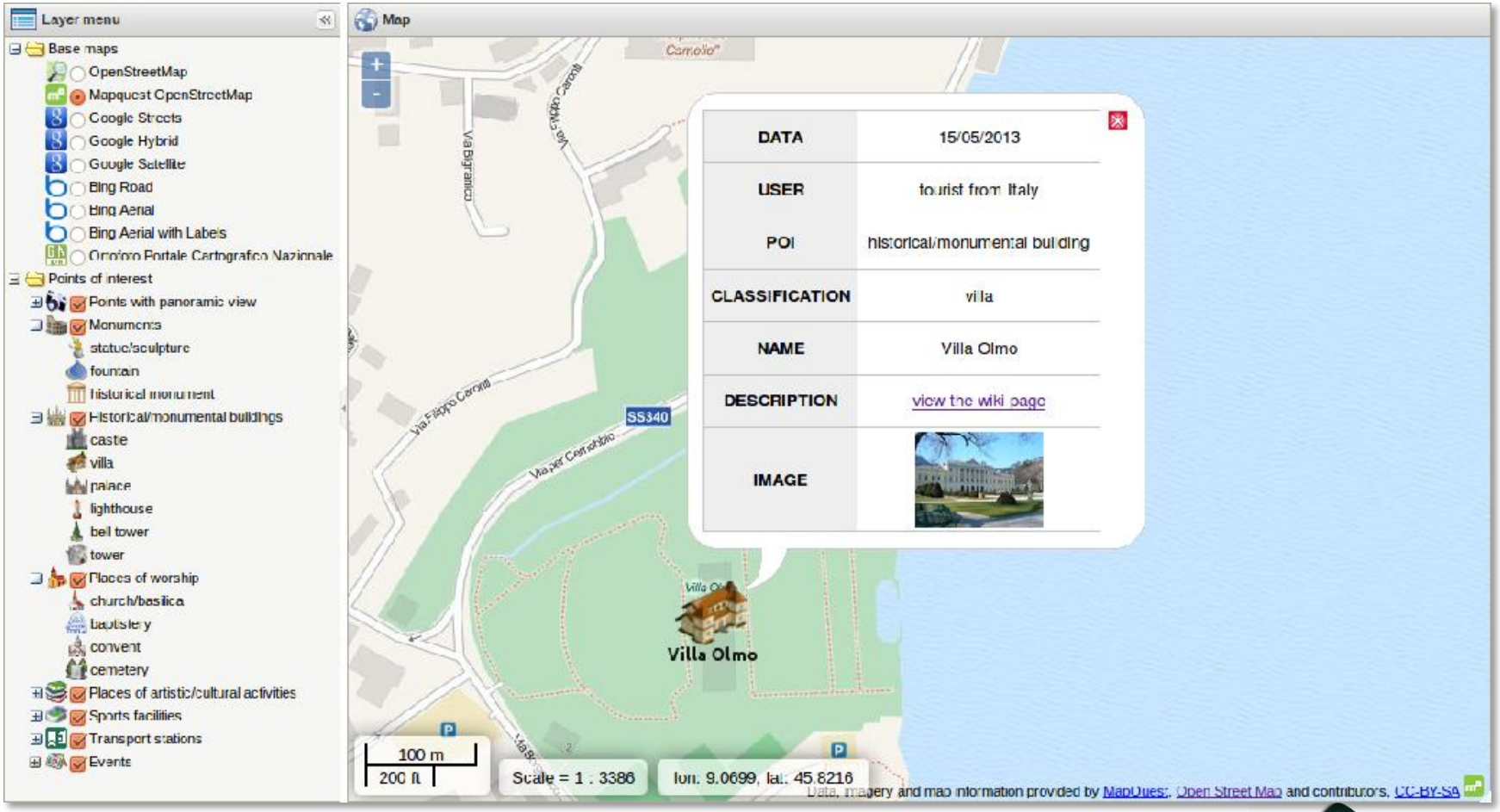
Example of data collection: Point of interest



Example of data collection: Point of interest

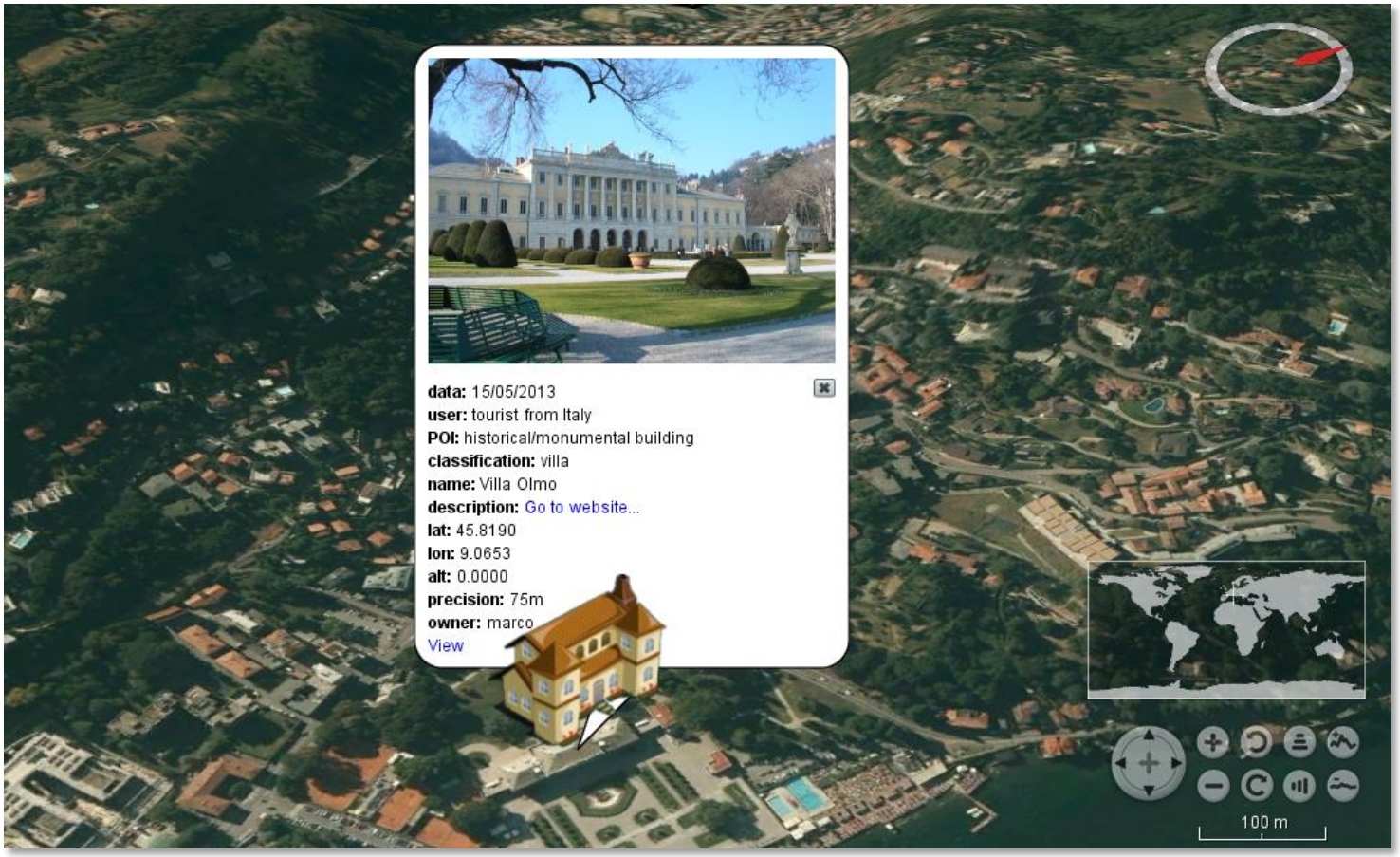


2D data visualization: Points of interest

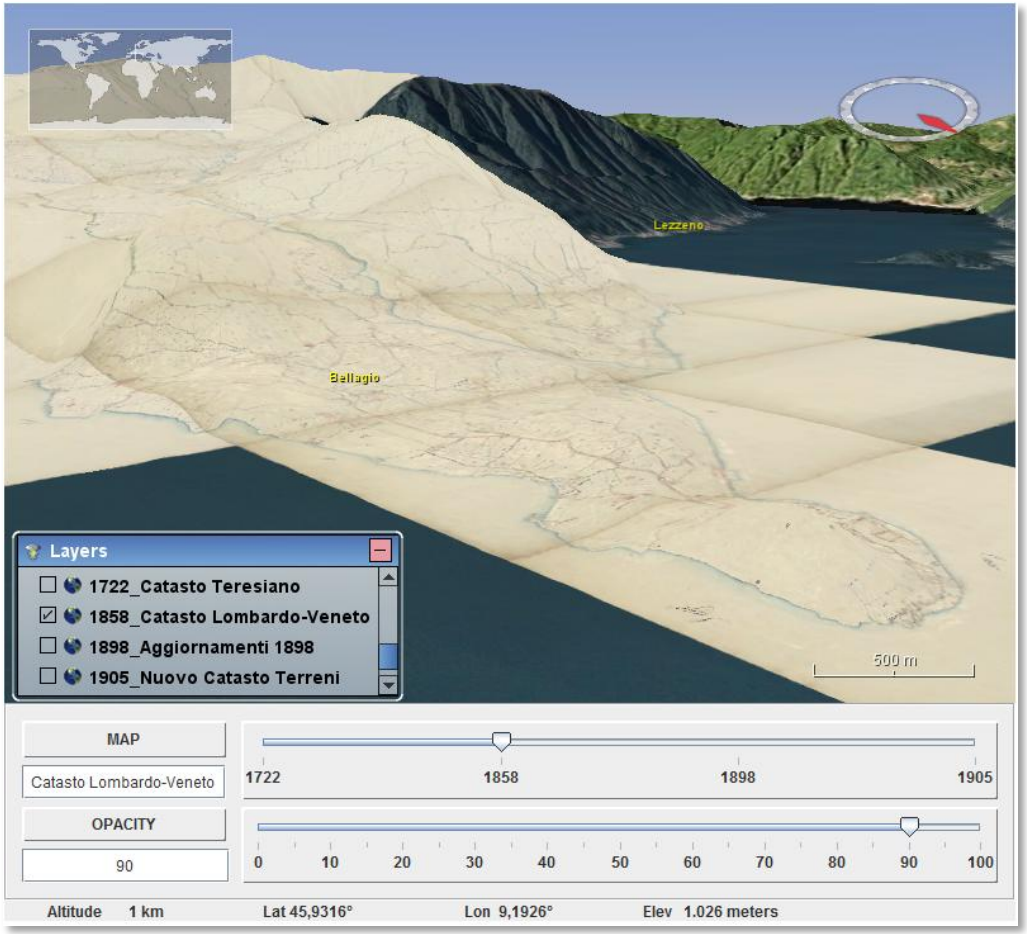


Le opportunità non hanno confini

3D data visualization Points of interest



Multidimentional visualization



NASA World Wind

Free and open source NASA's virtual globe

Java Software Development Kit (SDK)

Augmented Reality

- Perceived Reality
  - 5 senses (sight, hearing, smell, taste, touch)
- Augmented Reality
  - Enrichment through information obtained by devices
    - smartphone, Google glass, etc.
  - GPS to convey the information related with the current position

Augmented Reality

Mixare (MIX Augmented Reality Engine)

- http://www.mixare.org

❖ augmented reality browser

- ➢ Android and iPhone
- ➢ License: GPLv3

❖ Peer s.r.l. (Appiano, BZ)

Augmented Reality

ARToolKit

- http://www.hitl.washington.edu/artoolkit/

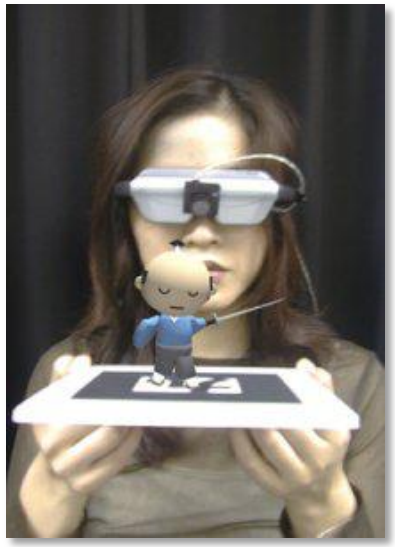
❖ library for building Augmented Reality applications

- ➢ SGI IRIX, Linux, MacOS and Windows OS
- ➢ Licence: GPL (non commercial usage)

❖ HIT Lab at the University of Washington (US)

HIT Lab NZ at the University of Canterbury (NZ)

ARToolworks, Inc, Seattle (US)



Augmented Reality

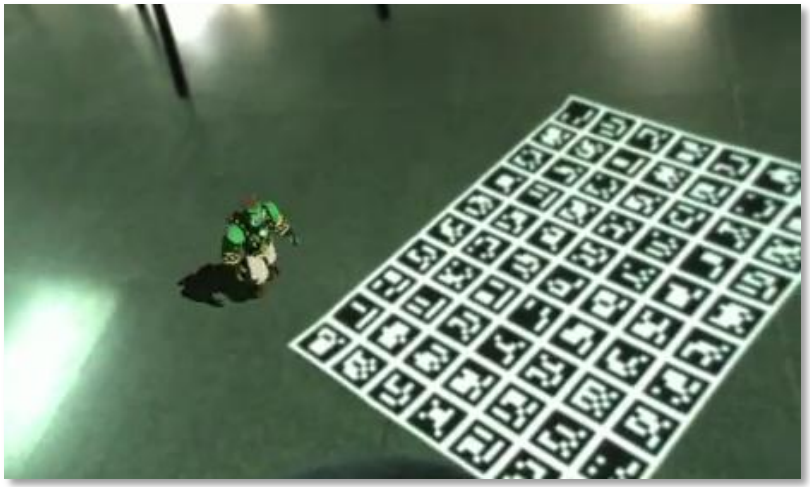
ArUco

- http://www.uco.es/investiga/grupos/ava/node/26

❖ C++ library for augmented reality applications

- ➢ Linux, Windows
- ➢ Licence: BSD

❖ Universidad de Córdoba (ES)



Augmented Reality

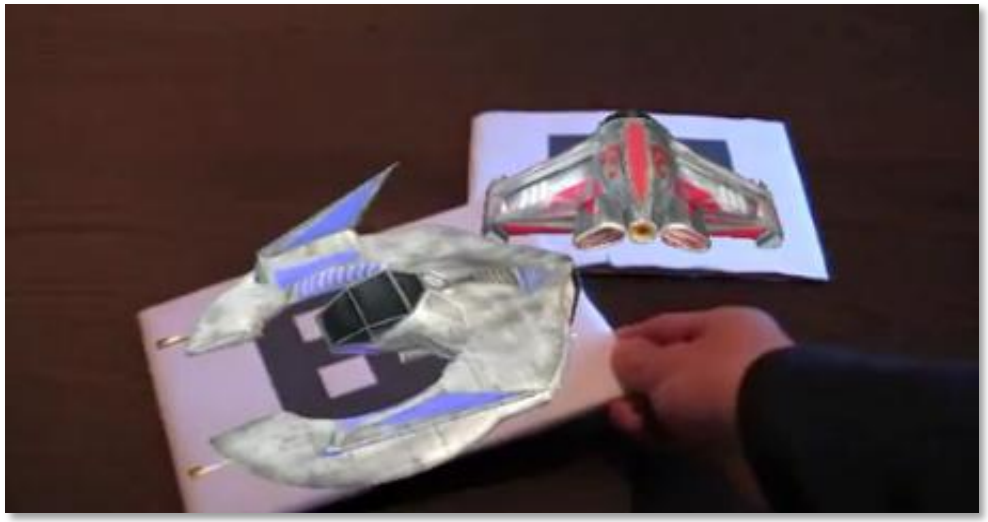
GRAFT (Glyph Recognition And Tracking Framework)

- http://www.aforgenet.com/projects/gratf/

❖ project include C++ library for augmented reality applications

- ➢ Windows
- ➢ Licence: GPL v3

❖ AForge.NET




INTERREG
ITALIA-SVIZZERA ITALIE-SUISSE ITALIEN-SCHWEIZ
POLITECNICO DI MILANO
gfoss.it
Associazione Italiana per l'Informazione Geografica Libera
OSGeo
Unione Europea
Fondo Europeo di Sviluppo Regionale
DATA INFORMATION
COLLABORATION
INTERNET WEBGIS TABLET SMARTPHONE 3D
USERS PATH LOCAL AUTHORITIES ITALY HISTORY
COMO LAKE SHARING VIA REGINA
COMMUNITY ART NATURE ENVIRONMENT
PARTICIPATION SWITZERLAND
TRADE CULTURE ASSOCIATIONS
TOURISM
Regione Lombardia
Le opportunità non hanno confini
I CAMMINI DELLA REGINA
percorsi transfrontalieri legati alla Via Regina