iNovitas

Infratech Jyväskylä
infra3D

12 May 2017

Manuel Dätwyler
Product Management infra3D
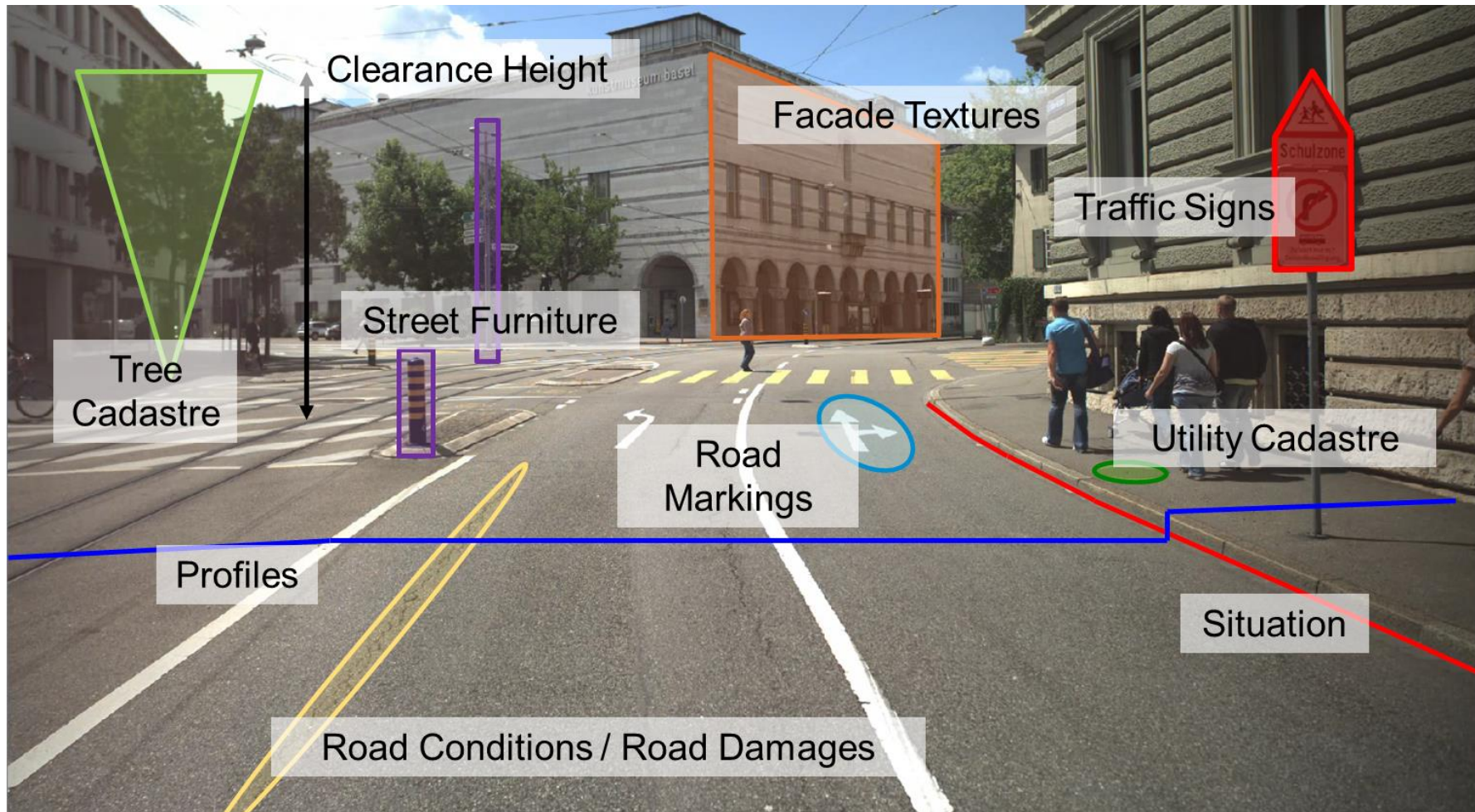
inspiring

innovative

unique

simplify

What's the issue?

«cost-intensive infrastructure management»

What are yours subjects in road infrastructure?
«highly detailed and accurate 3D-representation of road and rail corridors»

Agenda
«What's it all about»

- Vision & basics
- Technology
  - Acquisition system
  - Infrastructure platform
- Live Demo
- Use cases
  - Virtual site inspection
  - Project planning
  - Mapping and inventory
  - Analysis of pavement condition
  - Picture documentary
  - Project communication
- Conclusion

infra3D

Vision & basics

Our Vision

«immerse infrastructure»

analyse

visualize

collect spatial data

measure

...easy and direct
from your desktop

infra3D provides a highly detailed and accurate 3D representation of road and rail corridors directly on your workstation.

Our Vision

«envisioning infrastructure in an intuitive way»

Infrastructure management by iNovitas AG:

simple to use for everyone

cost-effective

useful for wide range of applications

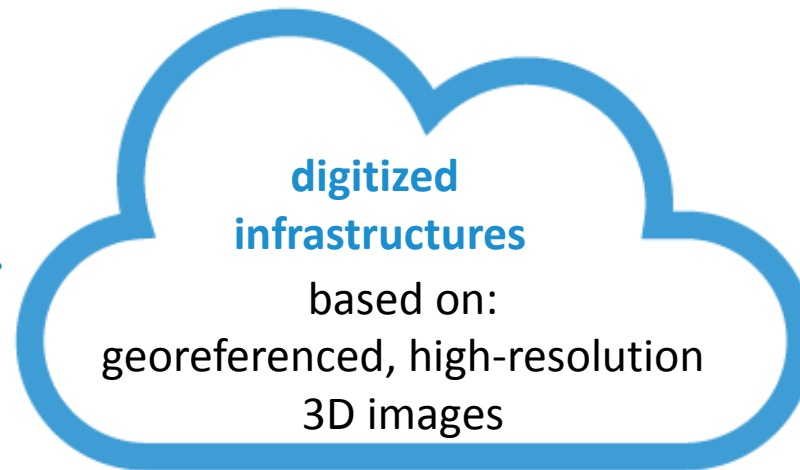**for all types of infrastructure (road, rail, tram, etc.)**
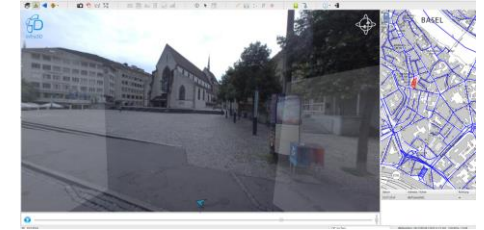
infra3D basics: digitizing and web based use

digitizing

shared use

infra3D web client (SaaS)

infra3D web services (PDaaS)
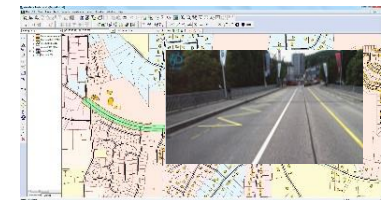
infra3D programming interfaces

digitized infrastructures
based on:
georeferenced, high-resolution 3D images

infra3D platform

- stereo images
- panoramic images
- LiDAR
- ...

infra3D basics: digitizing and visualizing
«envisioning infrastructure in an intuitive way»

spatial data collection

reproject processed data

Digitizing

Visualizing

image capturing

visualize existing spatial data
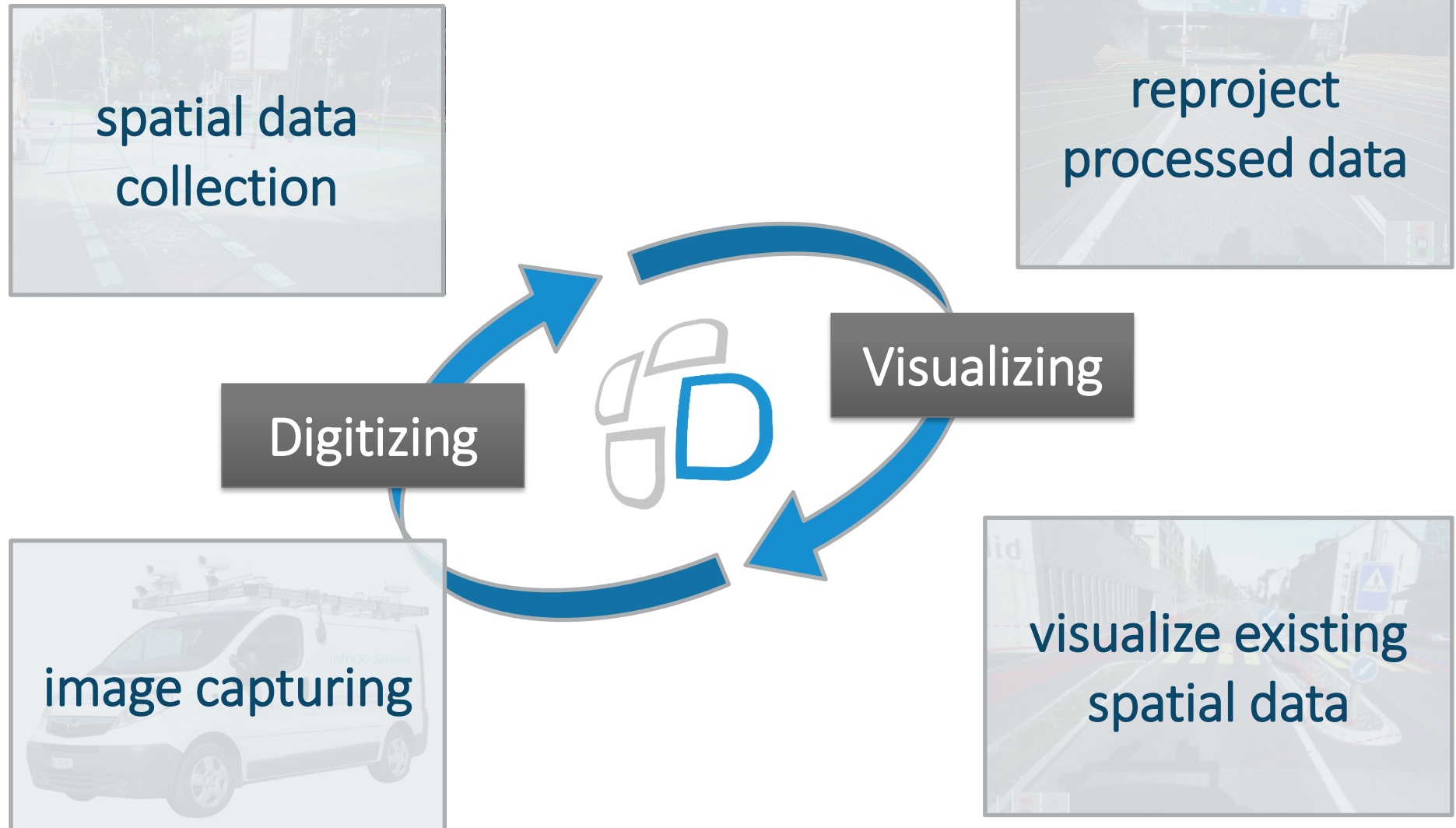
infra3D Technology

image acquisition

infra3D technology
«recording system»

Navigation System
GNSS, IMU

Recording sensors
- 11MP cameras
- Spherical cameras
- HD cameras
- LiDAR sensors

Controllers
Computer, SyncBox, acquisition software

System calibration

infra3D technology

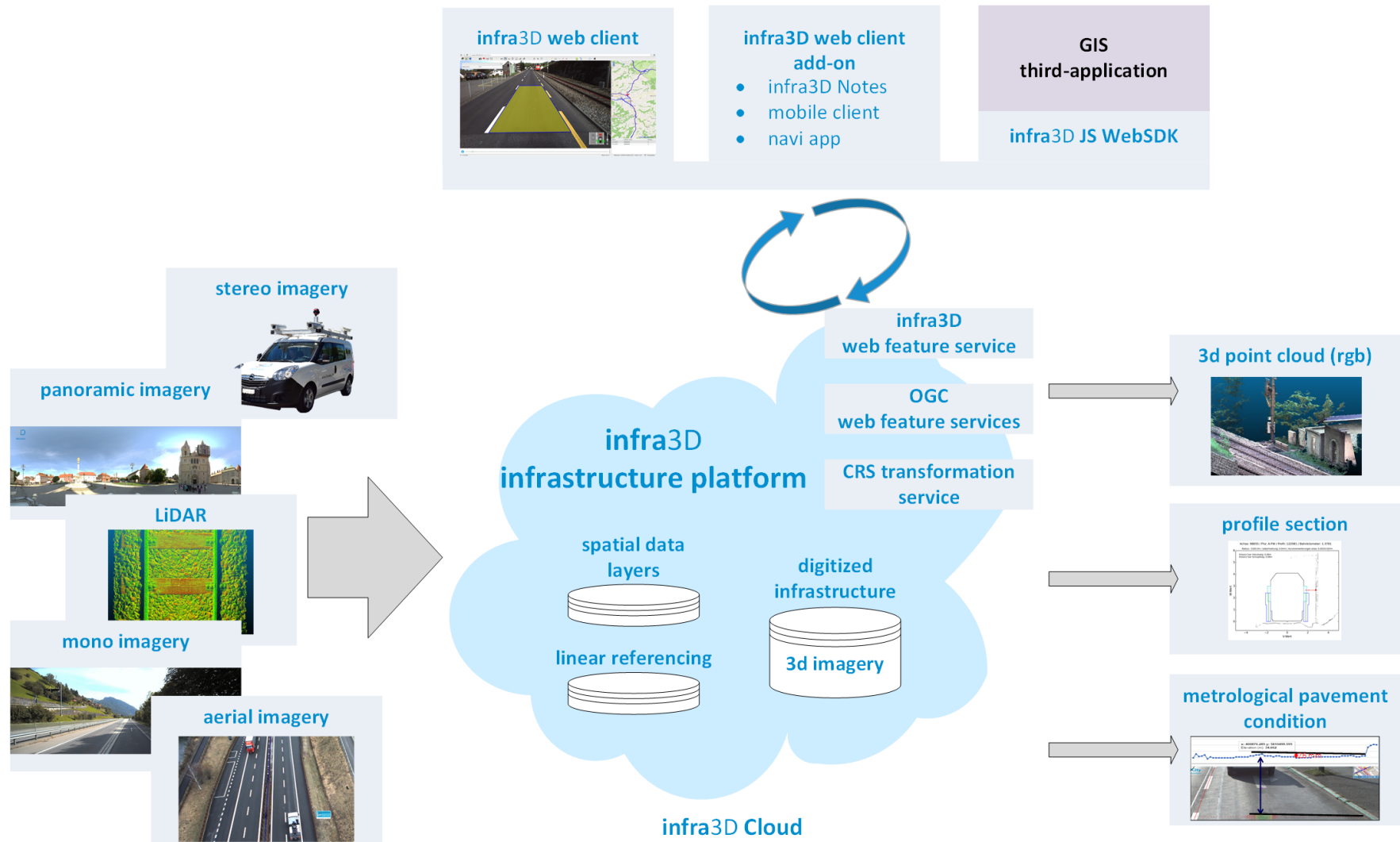«platform independent recording system»

infra3D technology
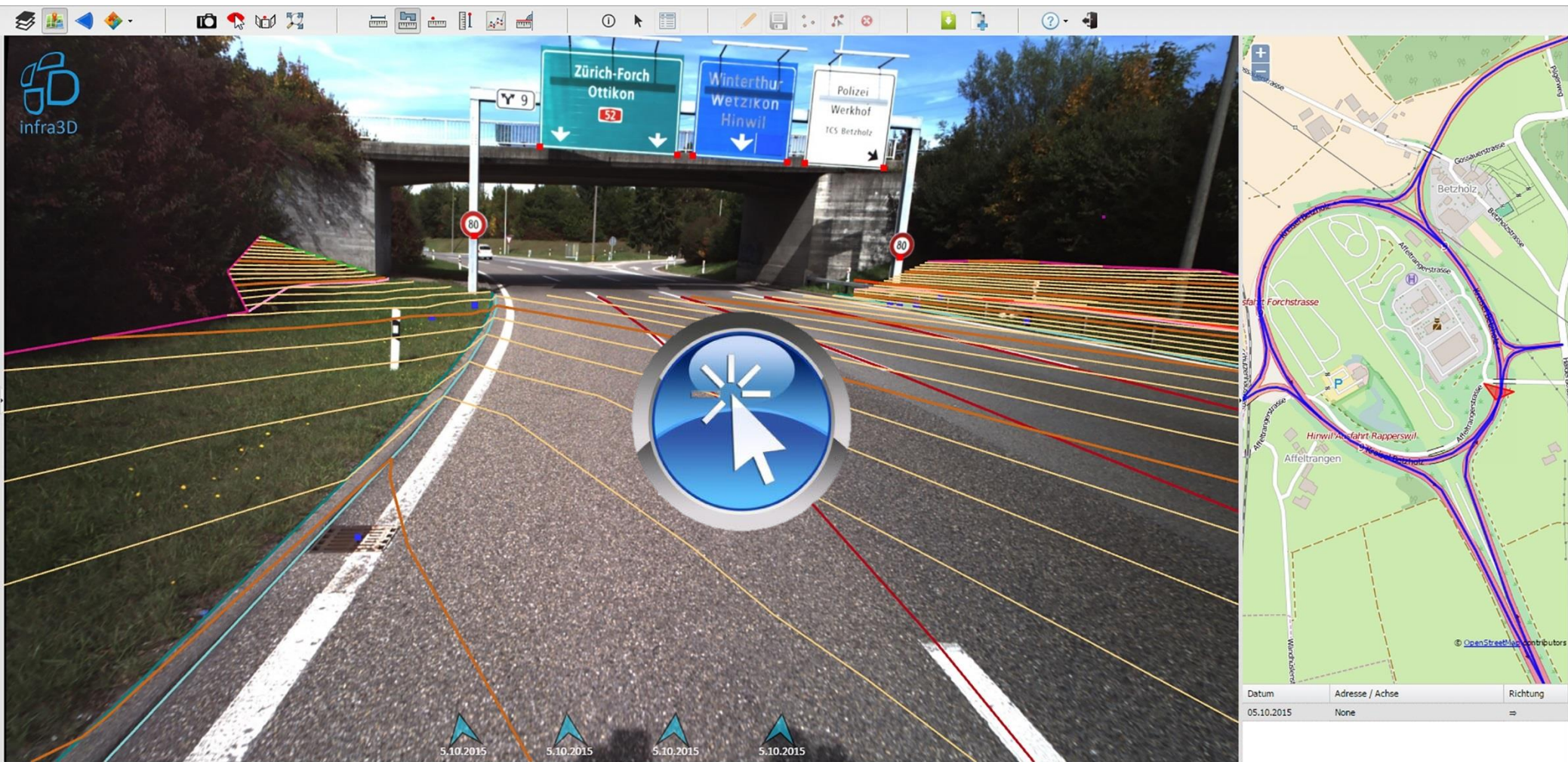
infra3D infrastructure platform

iNovitas

Working with huge amounts of image data

«infra3D streaming technology in the cloud»
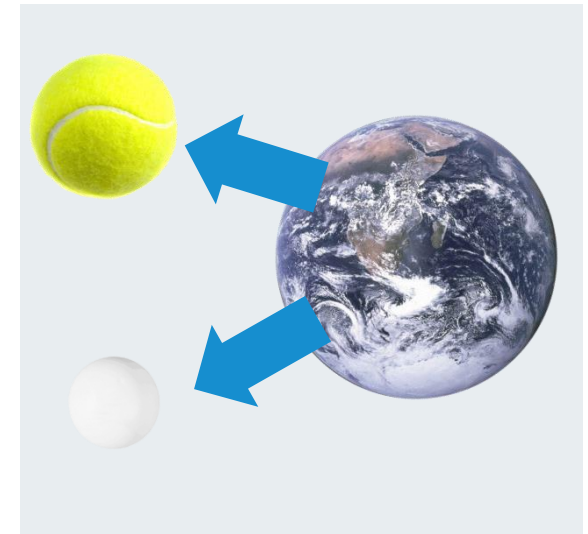
infra3D Live Demo

«immerse infrastructure»

3D measurement accuracy
«absolute and relative»

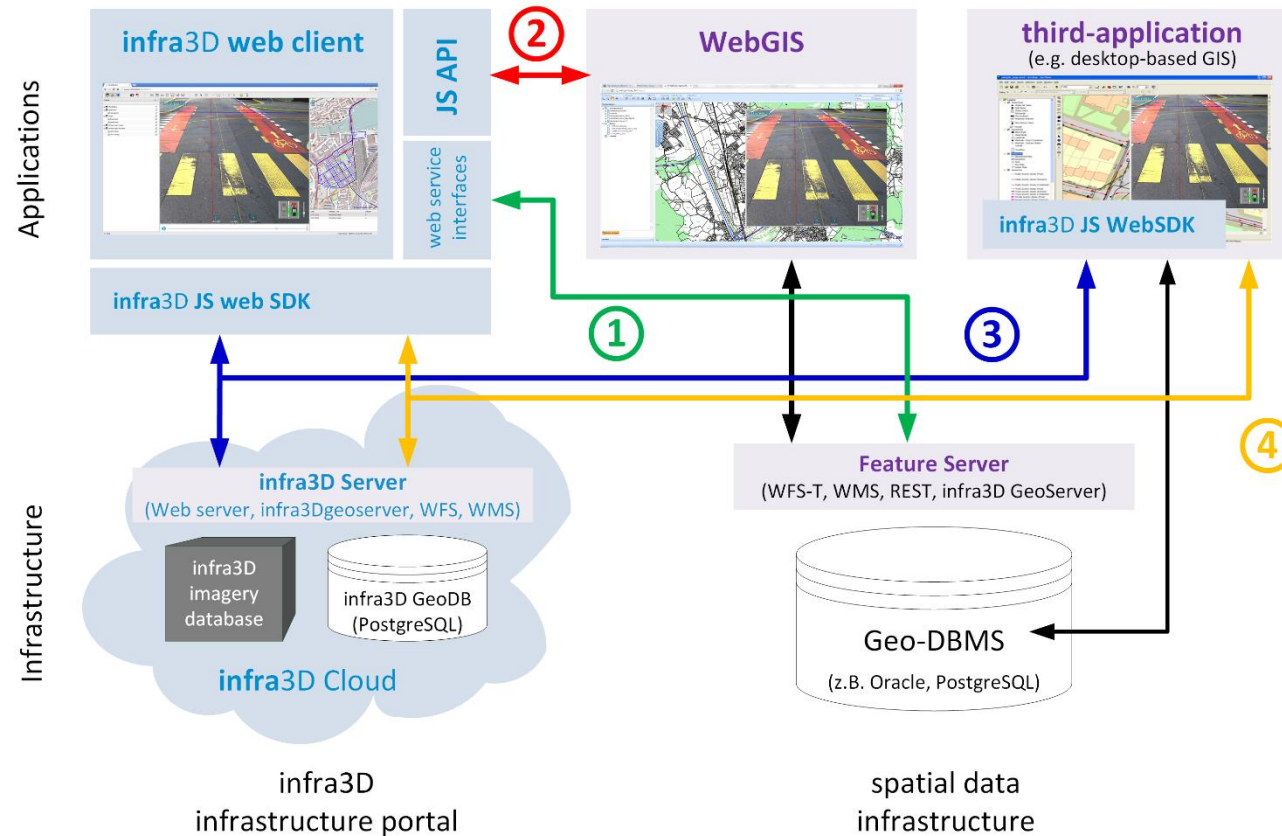| Relative	Distance		
Within frame	< 1 cm		

Absolut	Position	Height	3D
Standard georeferencing	3 – 20 cm	2 – 10 cm	
Advanced georeferencing	1 – 2 cm	< 1 cm	2 cm

Standard georeferencing: depending on the current GNSS signal coverage

Advanced georeferencing: use of visible control points in the images

infra3D platform interfaces

1. Connection spatial database to infra3D
2. Interaction of infra3D and WebGIS with infra3D API
3. Extensive integration of infra3D in third-application
4. Provision of spatial data through WMS and WFS-T

Examples

infra3D

infra3DGeoServer

Visualization of spatial data from the
infra3D infrastructure platform

**ArcGIS REST Feature
Server**

Visualization of spatial data from an
ArcGIS REST Feature Server

WFS-T Server

Visualization of spatial data from the
customers spatial data infrastructure

Web service with graphics

Visualization of graphics and icons from
a web service

Integrate infra3D with API and SDK

Synergis WebOffice

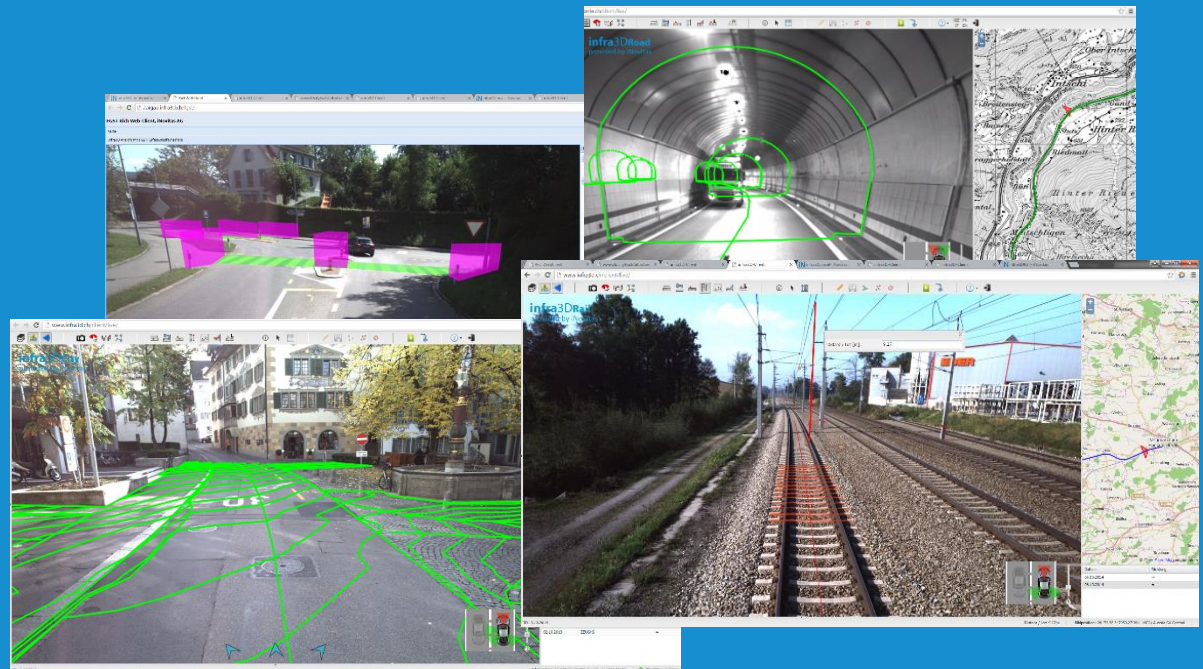Navigation and interaction with the infra3D API

geoProRegio Map+

Navigation and interaction with the infra3D API

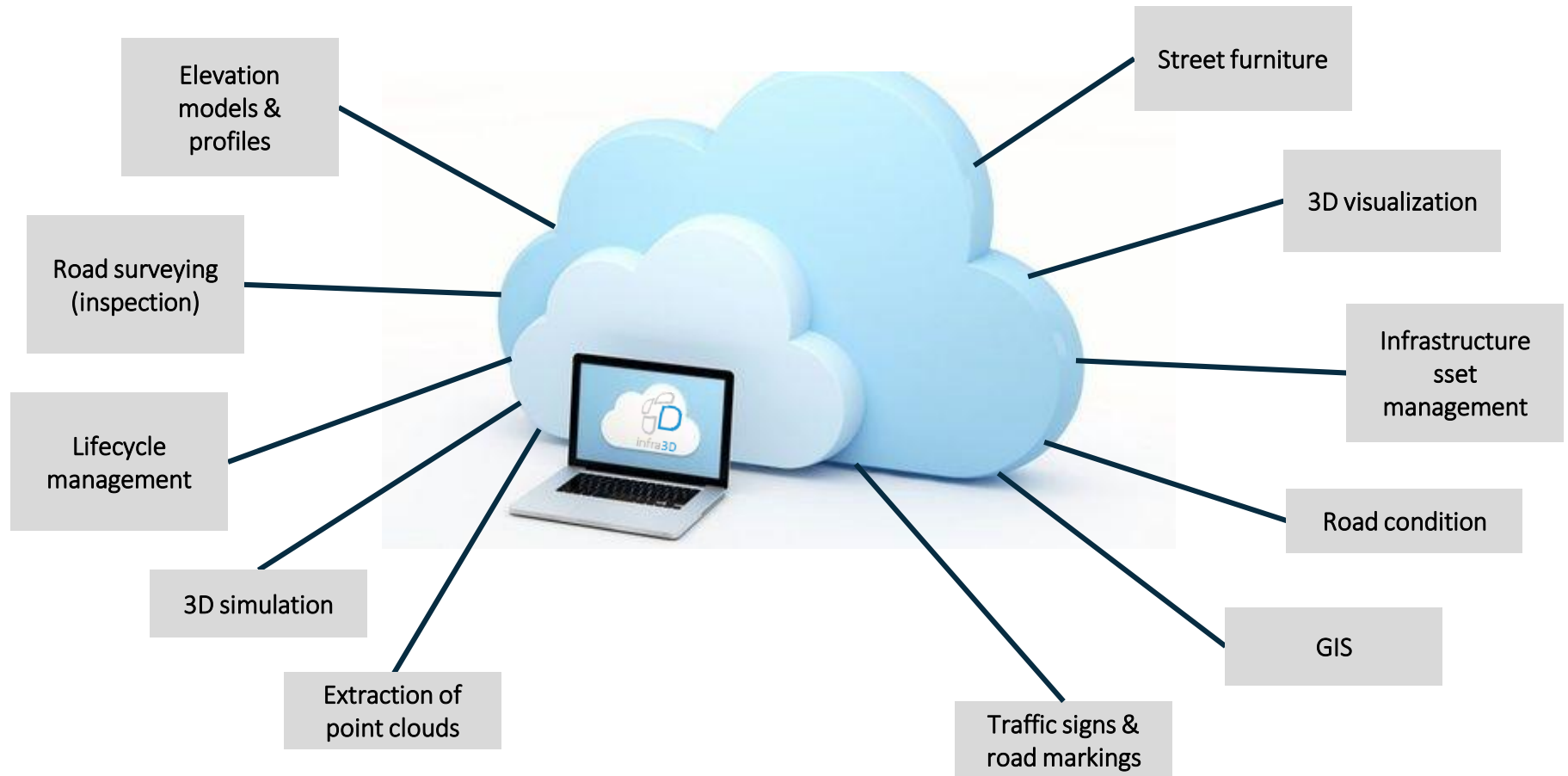**Integration infra3D Service in Bentley MicroStation**

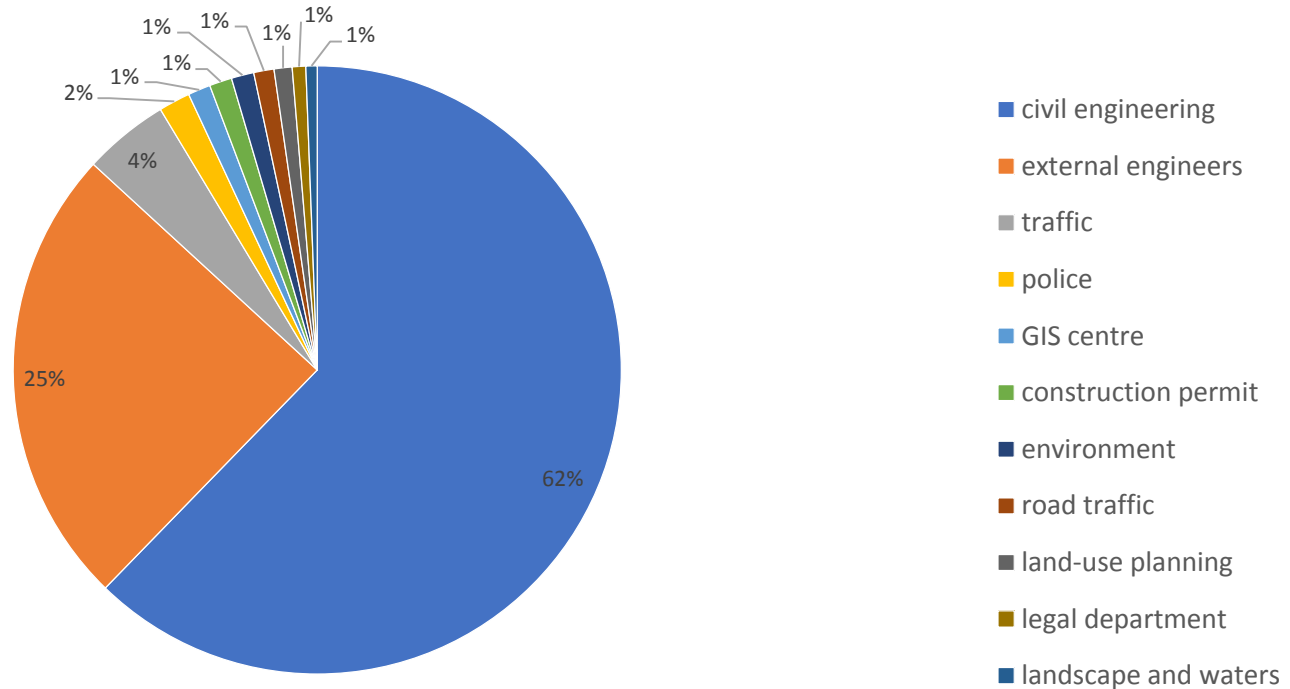Deep interaction with the infra3D SDK

Applications

Applications

«single acquisition – multiple use»

infra3D

Elevation models & profiles

Street furniture

3D visualization

Road surveying (inspection)

Infrastructure sset management

Lifecycle management

Road condition

3D simulation

GIS

Extraction of point clouds

Traffic signs & road markings

Virtual site inspection

«e.g. canton of Argovia»

Monthly average utilisation

Legend:
- civil engineering
- external engineers
- traffic
- police
- GIS centre
- construction permit
- environment
- road traffic
- land-use planning
- legal department
- landscape and waters

Pie chart values: 62%, 25%, 4%, 2%, 1%, 1%, 1%, 1%, 1%, 1%, 1%
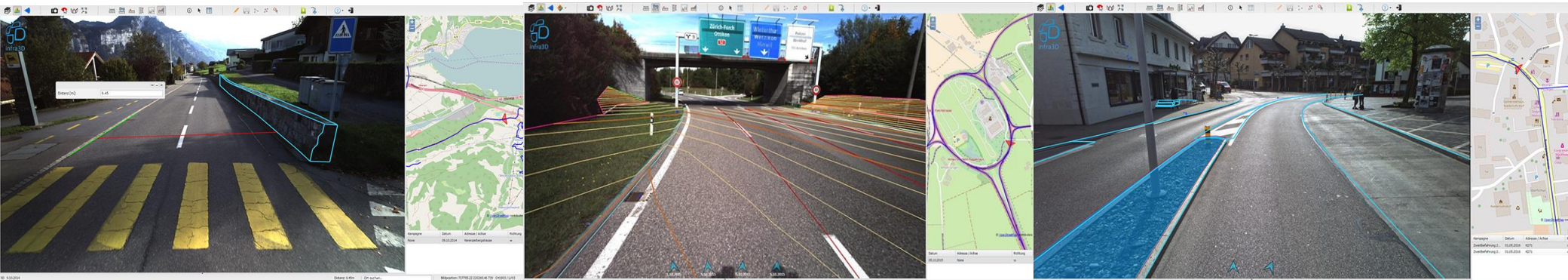
Conclusion

- 835 login per month (41 login per working day)
- Wide use in different departements
- Trend of use is increasing

Planning of infrastructure projects

«the most efficiant way of surveying»

Advantages:

- Digitized infrastructure for planning accessible anywhere and anytime
- Efficient measurement tools
- Minimized traffic disturbance and occupational safety
- Flexibility for changes during project
- Multiple use of different stakeholders

Project Oberlandautobahn:

Contact person:

Lukas Rüdin, Basler & Hofmann AG

→ Digital elevation model, site inspection, inventory, road profile, visualisation of project data

infra3D

Mapping & inventory

«smart management of all infrastructure assets»

Advantages:
- Easy and fast inventory and map updating
- Direct data management of a asset management system
- Massive reduction of surveying labours → saving time and costs
- Image documentation of all infrastructure assets
- Occupational safety and minimal traffic disturbance
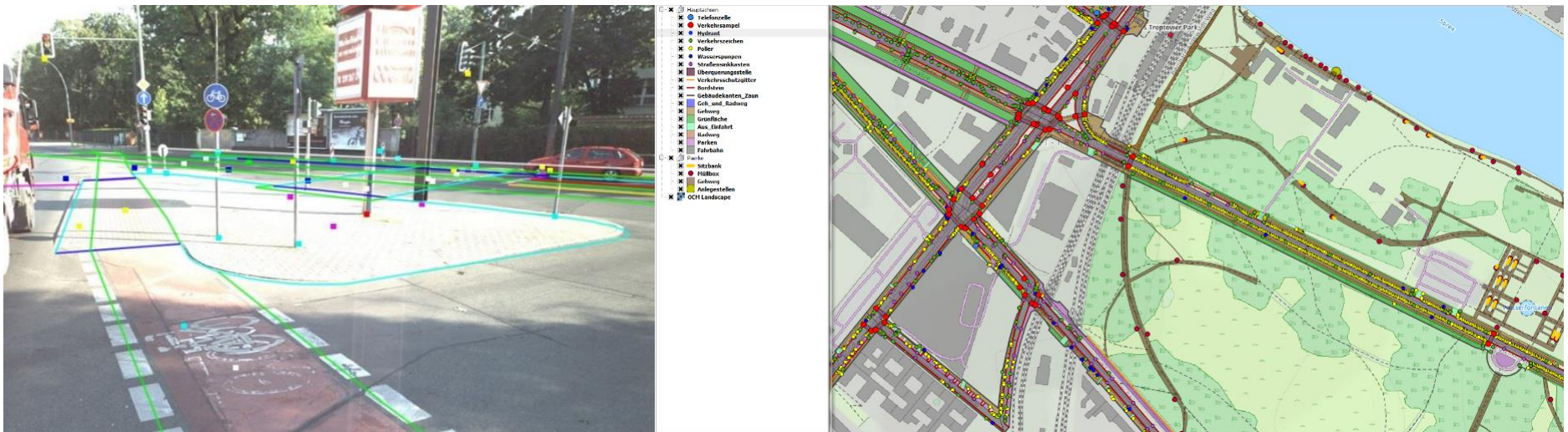
→ Extraction of a comprehensive object catalogue with 80 different object types (City of Berlin)

Road safety inspection

«situation analysis and action planning»
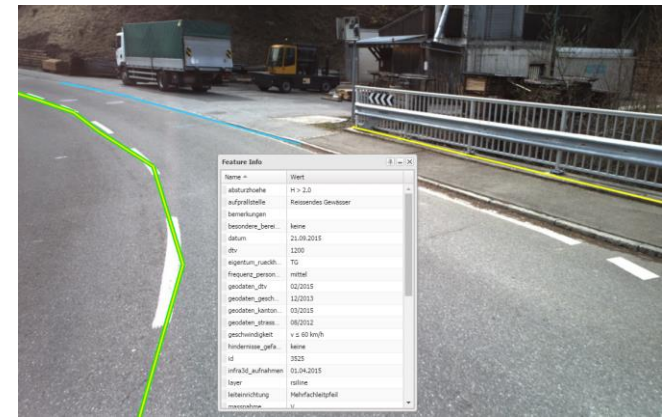
Advantages:

- Easy and efficiant weak point analysis
- Consistant hazard assessment
- Immediate planning of actions
- Simple measurement tools for investigation of specification
- Occupational safety

→ Analysis of zebra crossings (Argovia), road safety provisions (Thurgau)

Analysis of pavement condition
«e.g. Swiss standard specification SN 640 925b»

- Asphalt pavement distress (visual)
  - 22 types of distress
    (Cracks, Pot Holes, etc.)
  - Degree and extent of damage
  - I0: Pavement distress
  - I1: Pavement distress combined with
    rut depth

- I2: Longitudinal evenness (metrological)

- I3: Transverse evenness (metrological)

- I4: Grip

- I5: Bearing ratio

Analysis of pavement condition

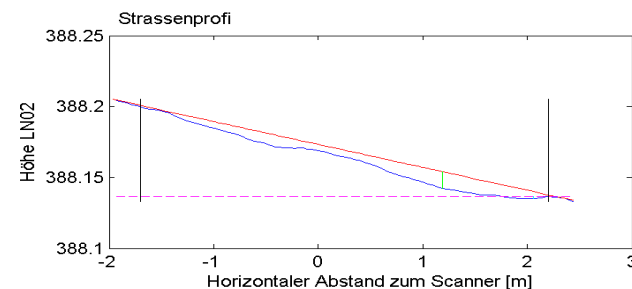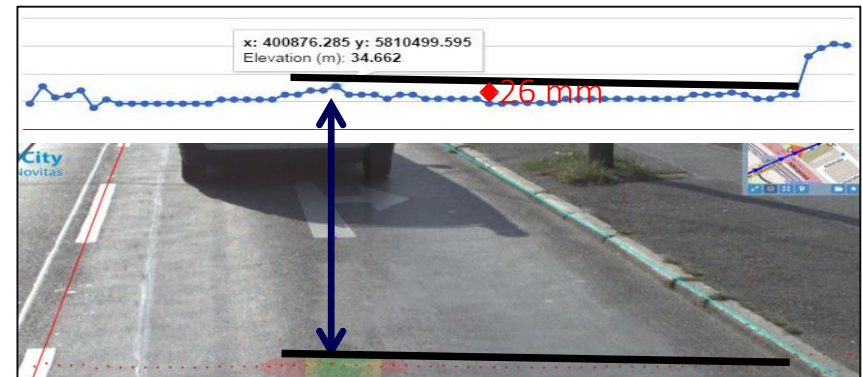«e.g. Swiss standard specification SN 640 925b»

Asphalt pavement distress (visual), $I_{0/1}$

- High resolution front cameras (11 MPix)

- Analysis of ruts with online transverse profile tool
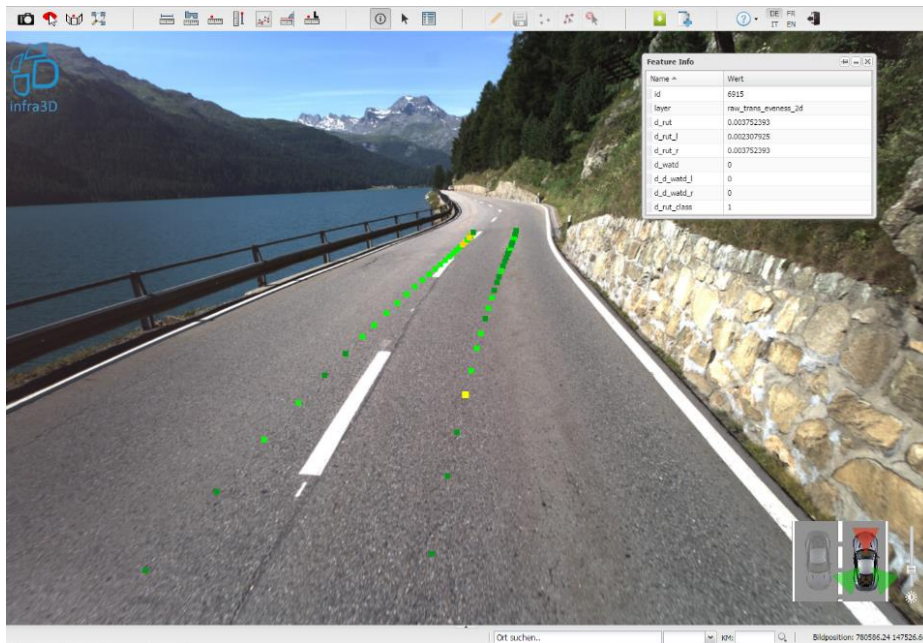
Metrological analysis of pavement

- Basic data from 3D imagery and LiDAR
- Transverse evenness, I_3
- Longitudinal evenness, I_2

x: 400876.285 y: 5810499.595
Elevation (m): 34.662

◆26 mm

Strassenprofi

Höhe LN02

388.25
388.2
388.15
388.1

-2 -1 0 1 2 3
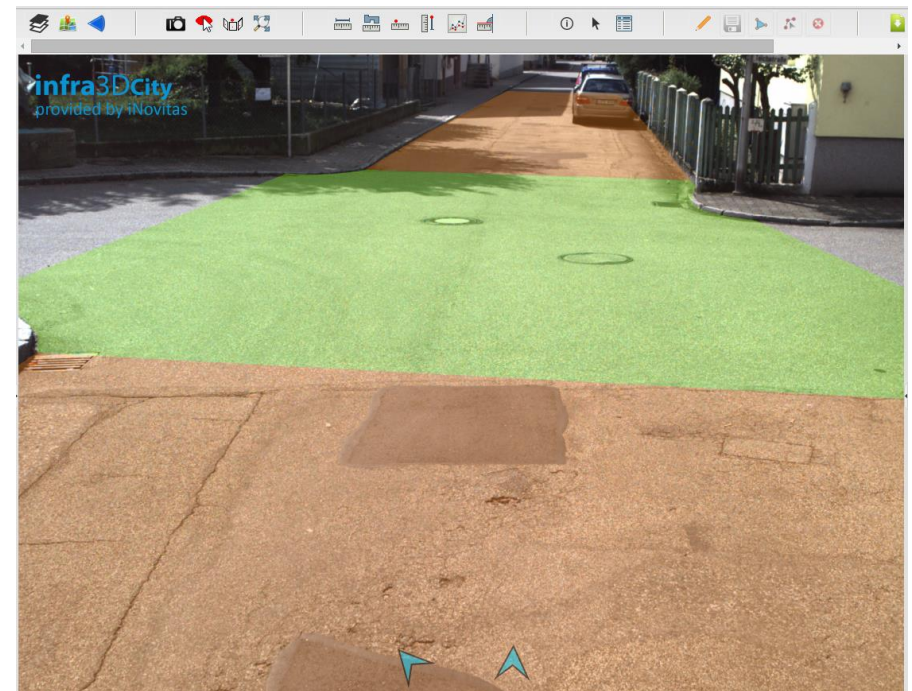
Horizontaler Abstand zum Scanner [m]

XKoord Nullpunkt:
661683.679
YKoord Nullpunkt:
255790.329
T-Wert [m]:
0.0119278
t-Wert [m]:
0.0015224

Analysis of pavement condition
«results»

Results of the metrological analysis: transverse evenness
with rut depth and water depth

Results of the visual analysis: pavement condition index
visualized as layer in the web client

Picture documentary of situation
«Full road history»

Management of different times

- Old imagery is always availible in the web client
- Comparison of different times
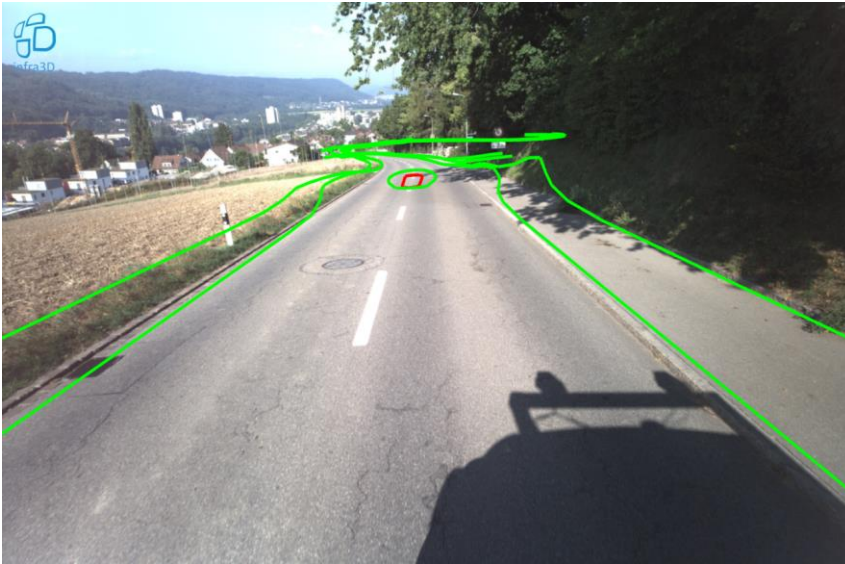- Documentation of construction site progress

2012

2015

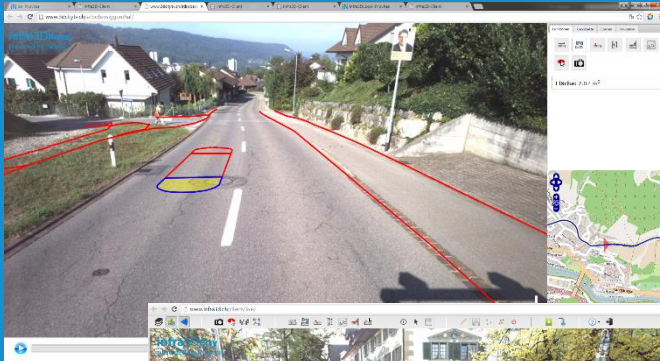→ Analysis of changes, documentary evidence, ect.
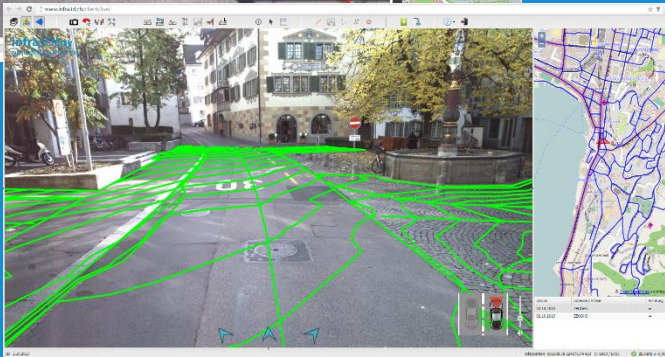
Communication in a project

«people think in images»

- Easy presentation of projects
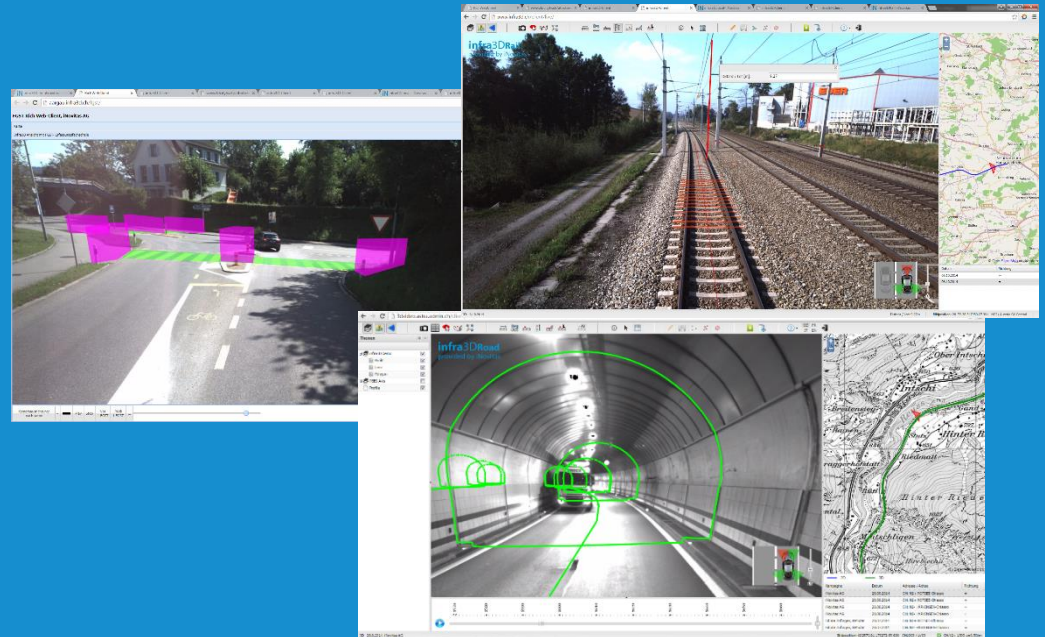- Virtual project space for sharing documents and results

It was never easier…

… to communicate
… to understand
… to work
… to document
… to initialize a project

iNovitas

It was never faster…

… to get basics
… to initialize a project
… to review
… to digitalize your city
… to map

iNovitas

infra3D – immerse infrastructure

Thank you for your attention

iNovitas AG
Oberrohrdorferstrasse 1c
5405 Baden-Dättwil
Switzerland
T +41 56 552 05 70
www.inovitas.ch
info@inovitas.ch

iNovitas