New standards
for a high presicion street database

Dr.-Ing. Johannes Ludwig

Content

- Introduction
- Capture of topographic road data
- Capture of road condition data
- examples and results of Projects
- Summary

Content

Development of the company

- 1975 Foundation of the engineering office „Ludwig“ in NRW
- 70er Programming of land consolidation
- 80er Entry into computer graphics, programming of an own GIS, transformation of analogue data into digital maps
- 1982 Change of the company to „Ludwig & Schwefer“
- 1982 Foundation of a national data centre
- 1990 Branch office in Schönebeck / town planning company
- 90er Transferring the first measurements using GPS in the NRW-cadastre
- 2000 Aerial flights with our own company aeroplane, interpretation of aerial photographs /Orthophotos
- 2003 eagle eye, mobile mapping system
- 2008 Outsourcing „**eagle eye** technologies“, Office in Berlin
- 2012 first delivery of eagle eye – System after europe-wide tender

eagle eye – more than 40 years expertise

- More than 40 years expertise (since 1975)
- Company owned plane since 2000
- Since 14 years working with mobile mapping vehicles
- More than 450 projects with more than 300.000 kilometre of acquisition
- Own sector for development
- Acquisition with mobile mapping vehicles, plane, UAV or terrestrial survey
- road, path, rails, over water, aerial mapping

Fields of activity … one for all

- Surveying/measurement of engineer and industry infrastructure
- Urban land-use planning
- Mobile mapping system (Stereo image-, Laserscan- , Panoramic images- and video)
- High precision and complete survey of road data
- measure of laserscan data
- Capture of inventory and road condition data
- Construction and maintenance of road information databases
- Pavement managementsystems
- Double-entry bookkeeping/ New local authority finance management
- Aerial flights/ Orthophotos
- Photogrammetry
- 3-D-Visualisation
- Consulting and training

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Building up road information

- UAV

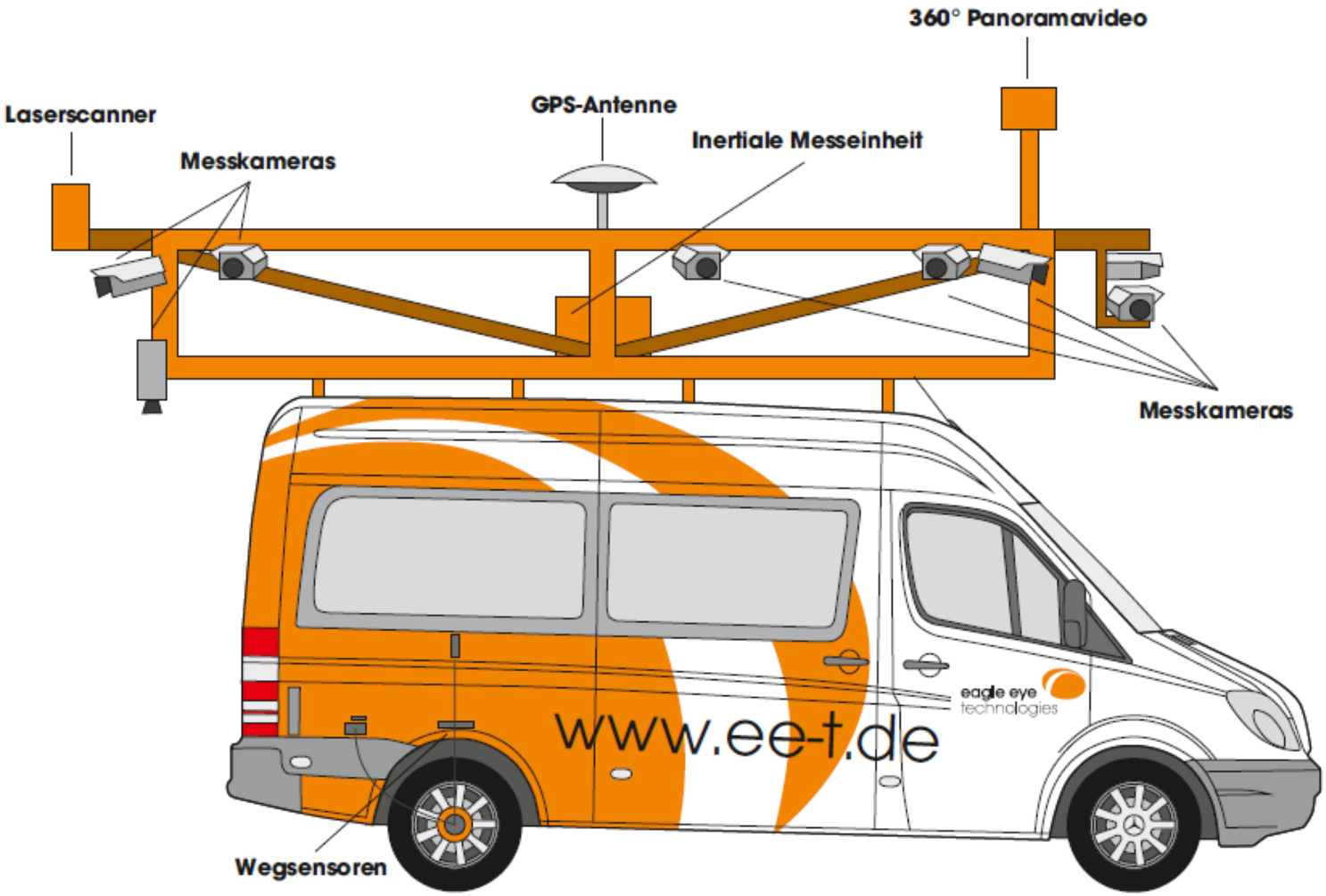
- aerial mapping

- terrestrial survey/GPS

- **eagle eye**-System

Performance with UAV, Mikrokopter

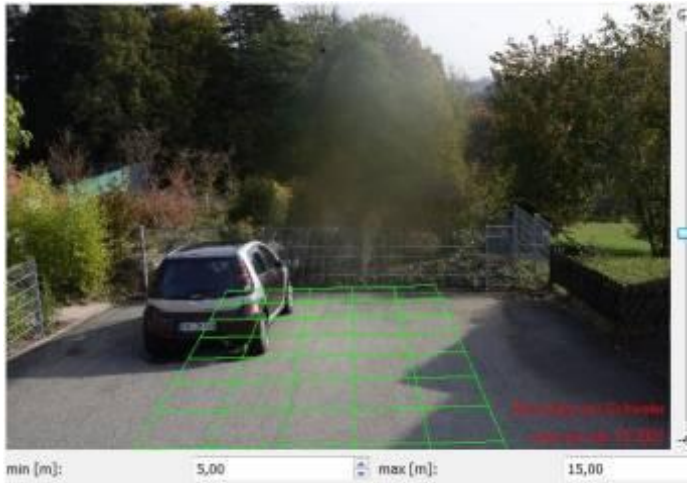
Mobile Mapping System



eagle eye-car pool

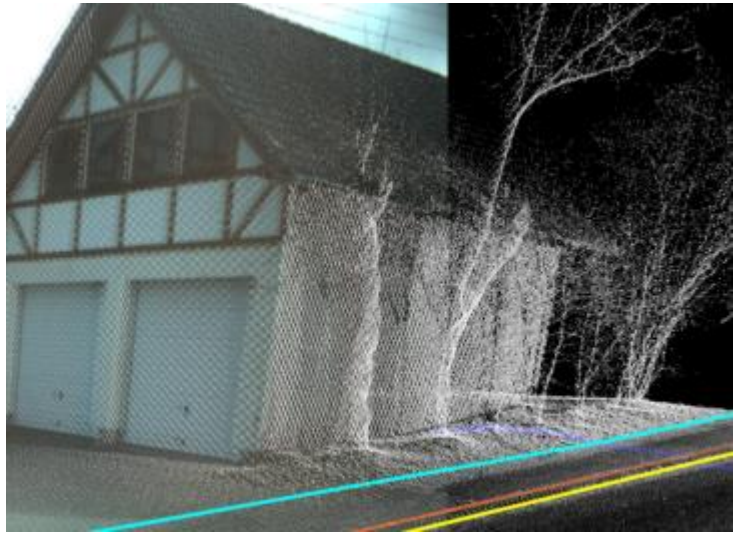
Mobile Methods for capture road data

- image or video



- panoramic images

- stereo images



- scan data

Capture of topographic road data

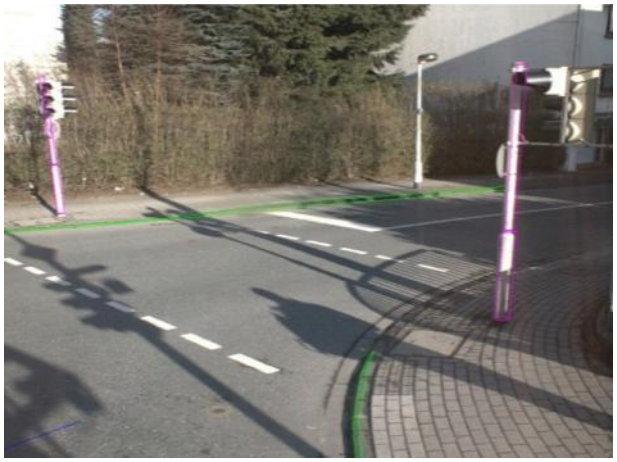
- Examples for processing
  - Point source objects
    - Traffic signs
    - Trees
    - Traffic lights
  - Vertical objects
    - Kerb
    - Gutter
- Extensive objects
  - Roads
  - Footpath and cycling lanes
  - Parking bays
- Height profile
  - Difference in altitude
- Photo documentation

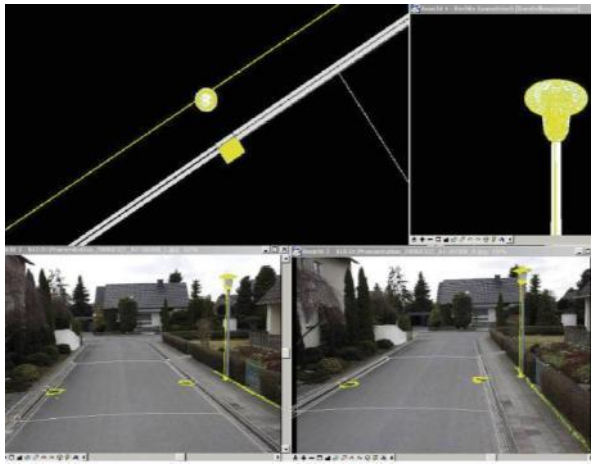
Capture of topographic road data

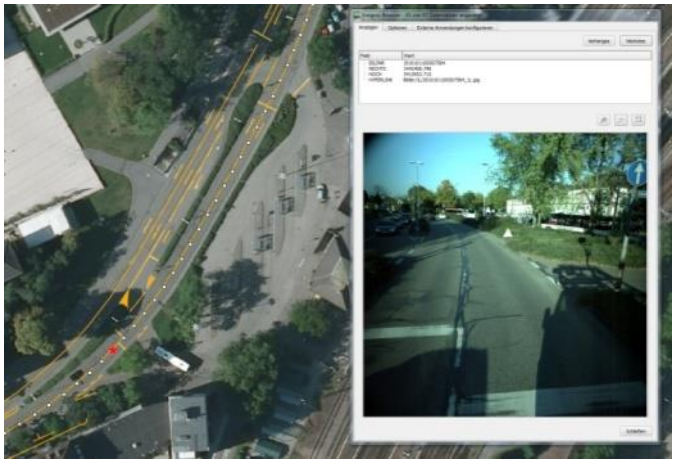
Examples for processing

- Point source objects trees, duct cover, hydrant etc.

- Additional information to geodetic coordinates can be captured







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Capture of road condition data

- Visual capture according to E EMI 2012
- The ee-t-Imageviewer makes it possible that the office duty generate a visual capture of the road condition based on the damage characteristics!

- Examples

Spot of patch

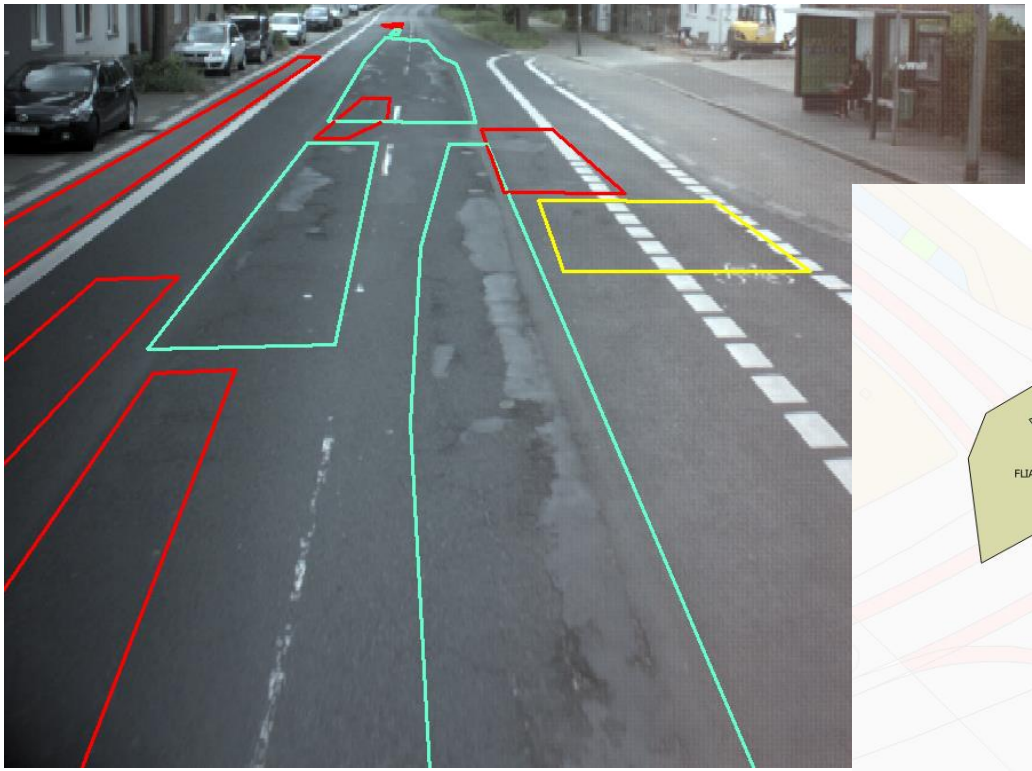
Monetarides

Spot of repair / Asset erosion

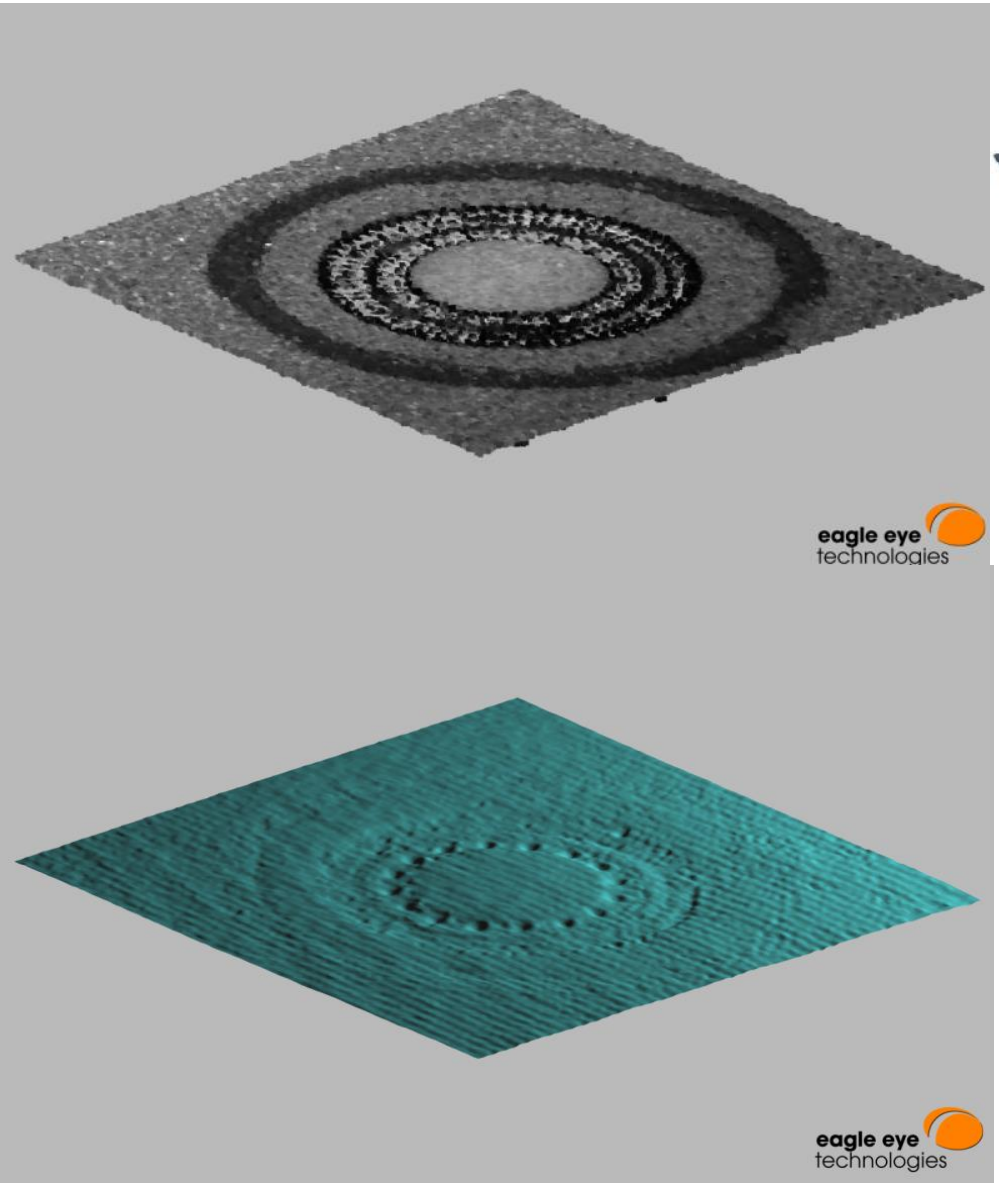
Extensive patches

Illustration of the condition valuation

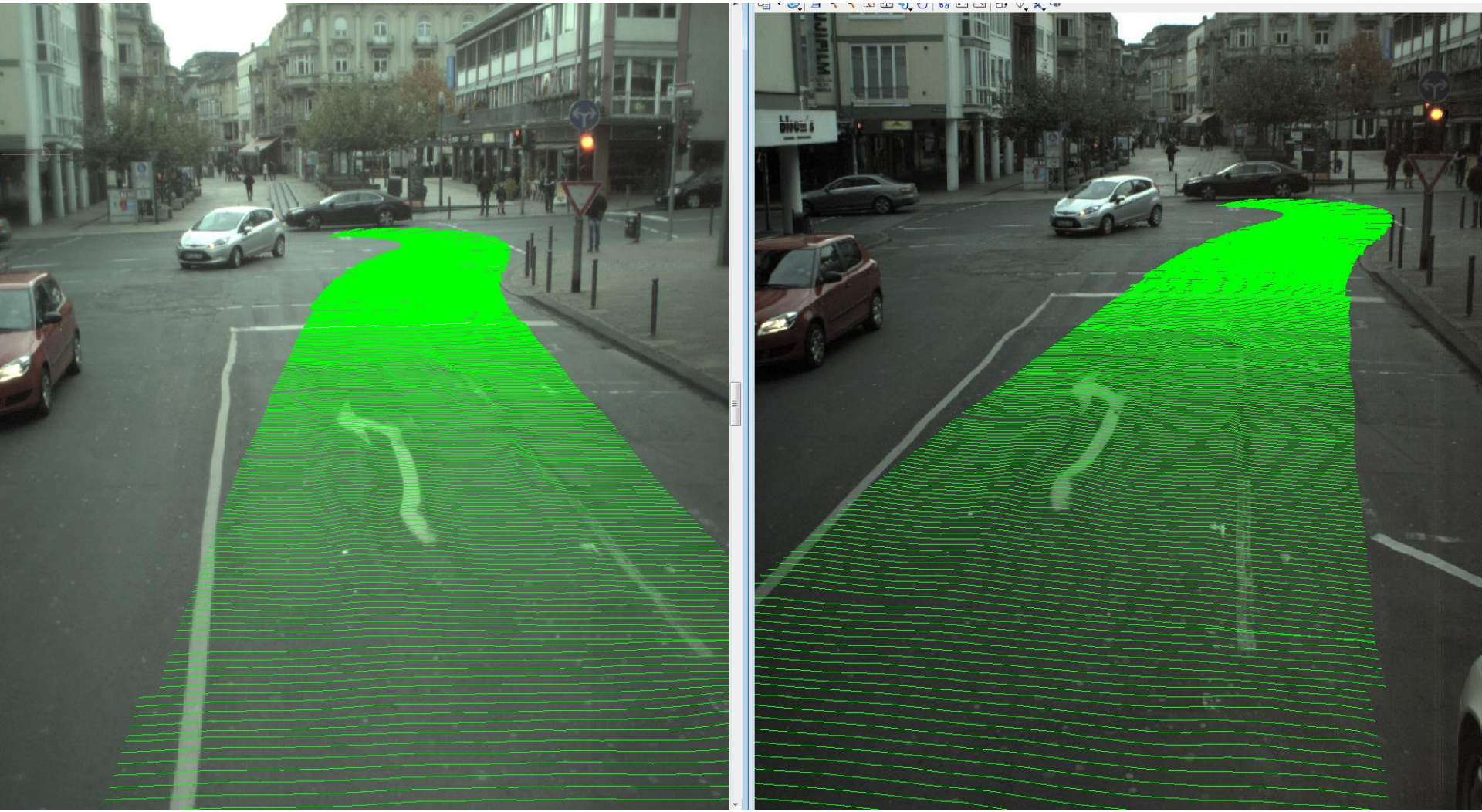
- Technical measurement of road condition data



Resolution of eagle eye system



Kinematic data acquisition



result

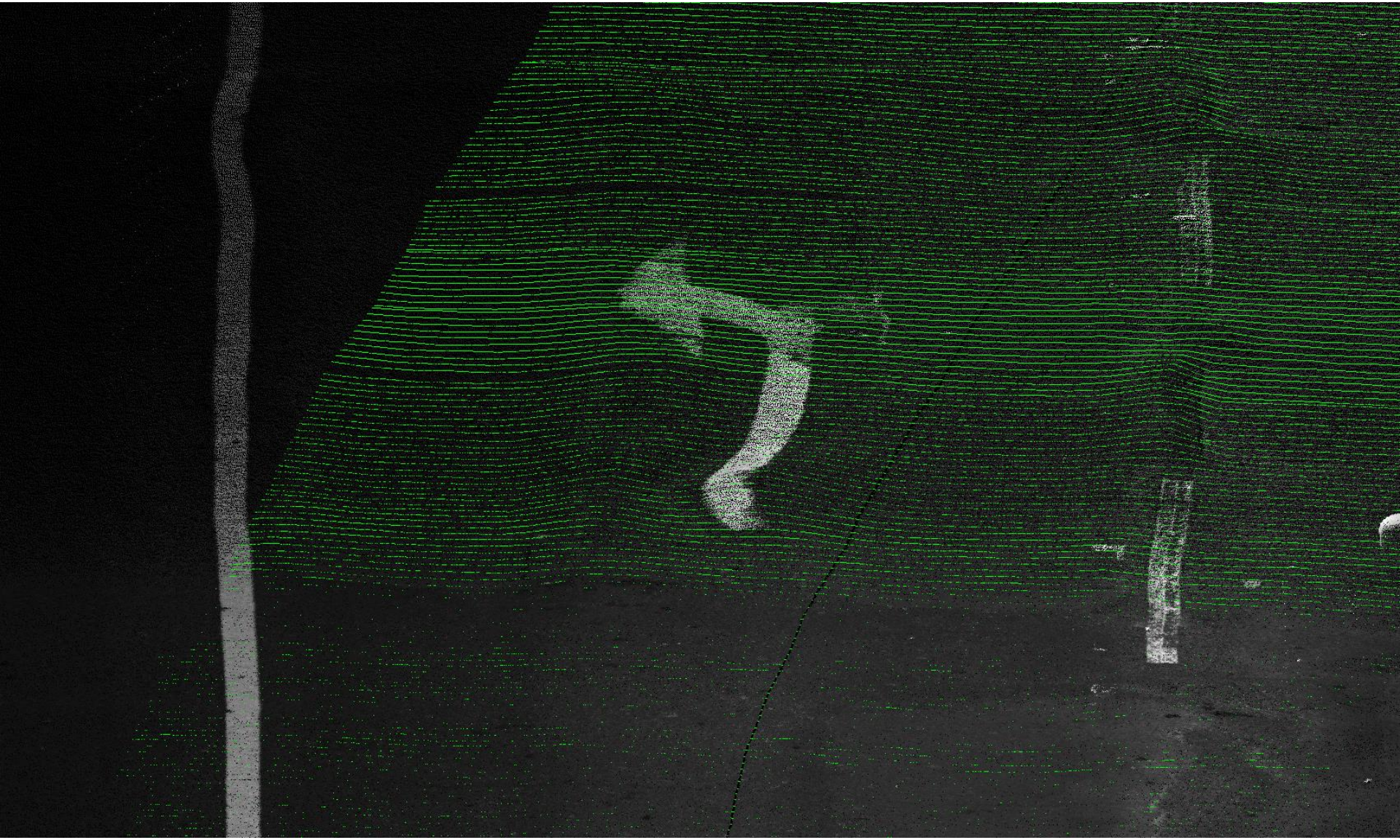
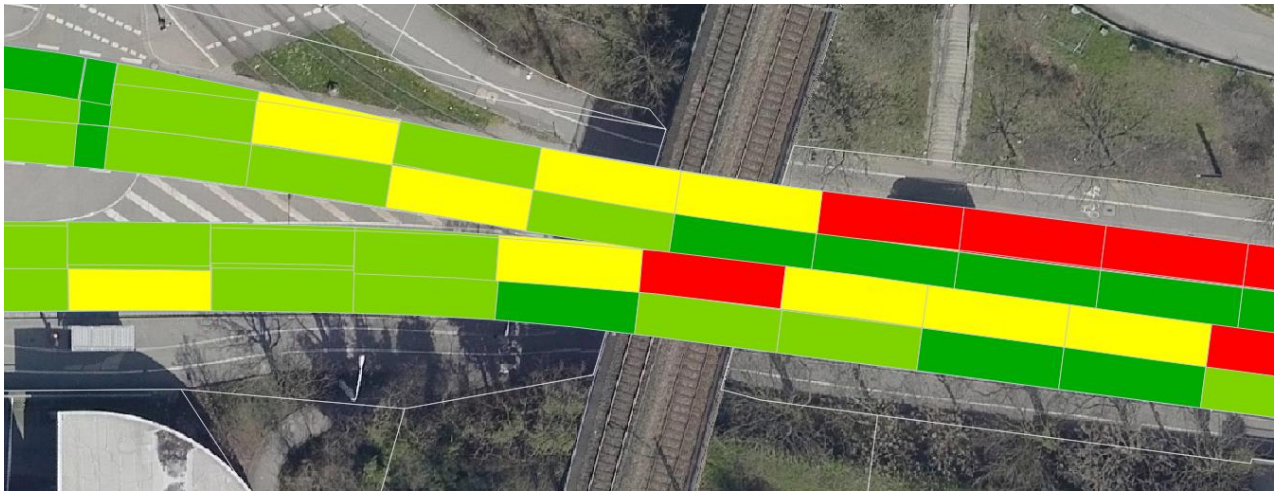
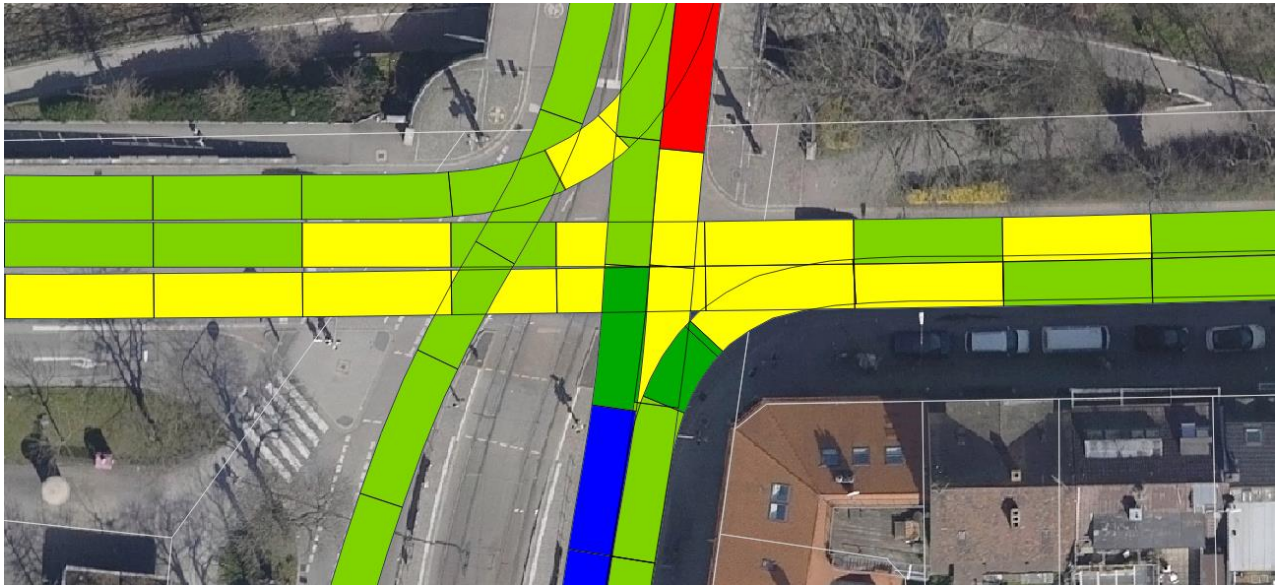


Illustration of the condition valuation

- Technical measurement of road condition data





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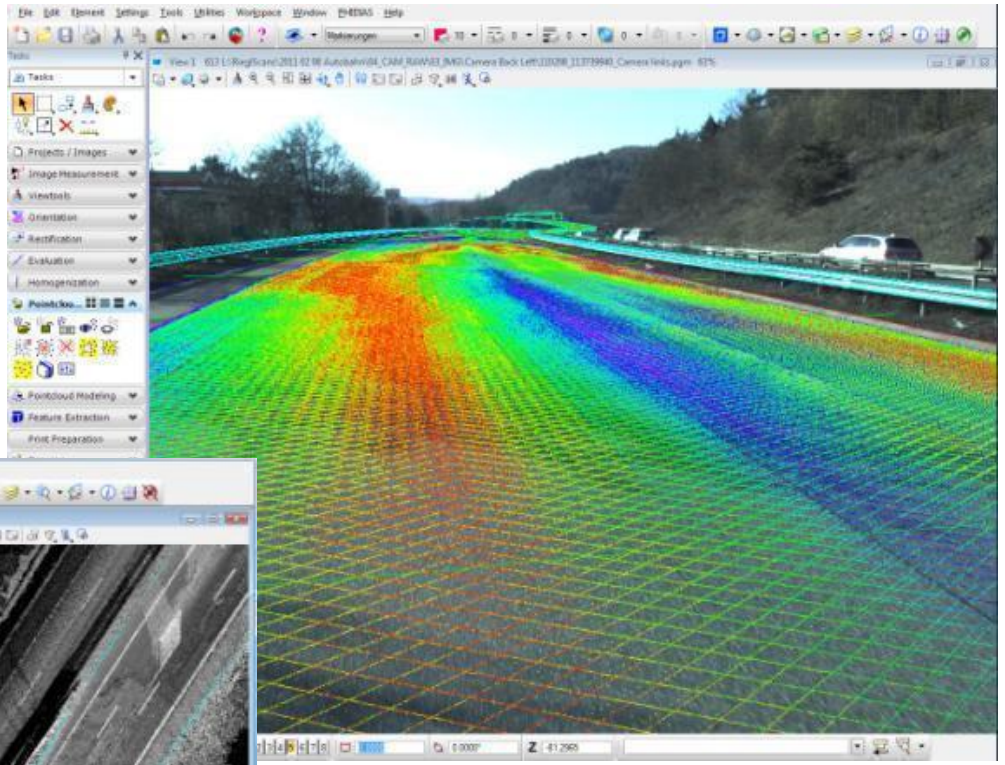
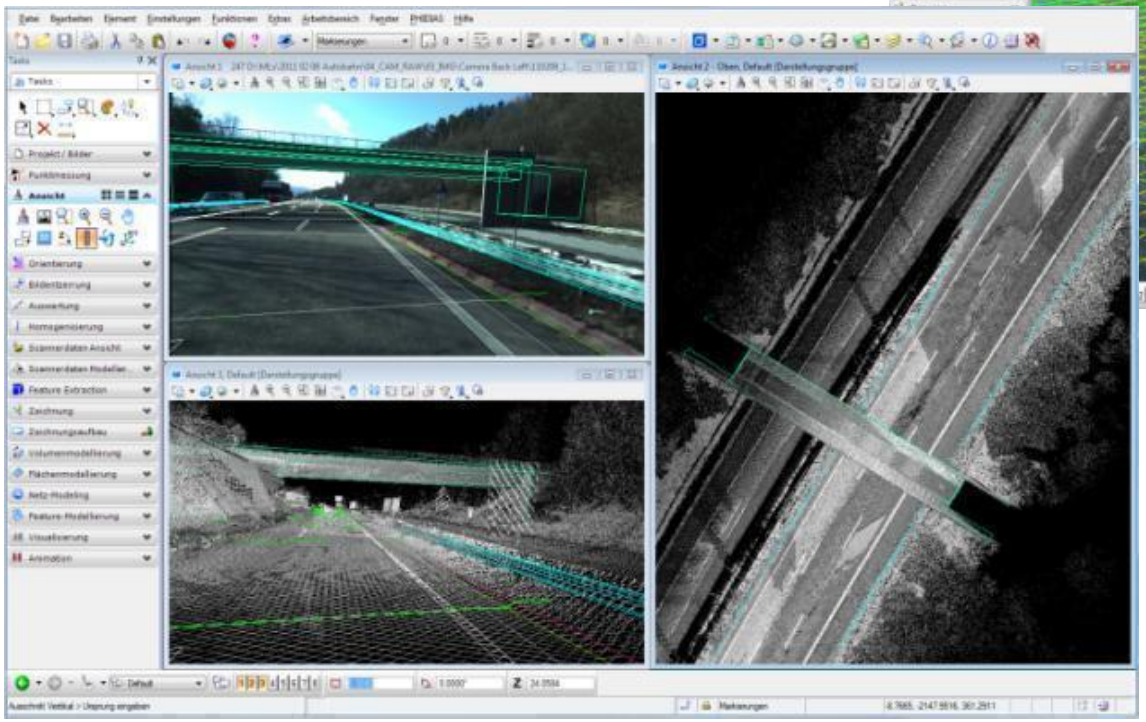
mobile measurement Freeway/Highway

- accuracy (absolut) under
  2 cm at geodetic position and hight

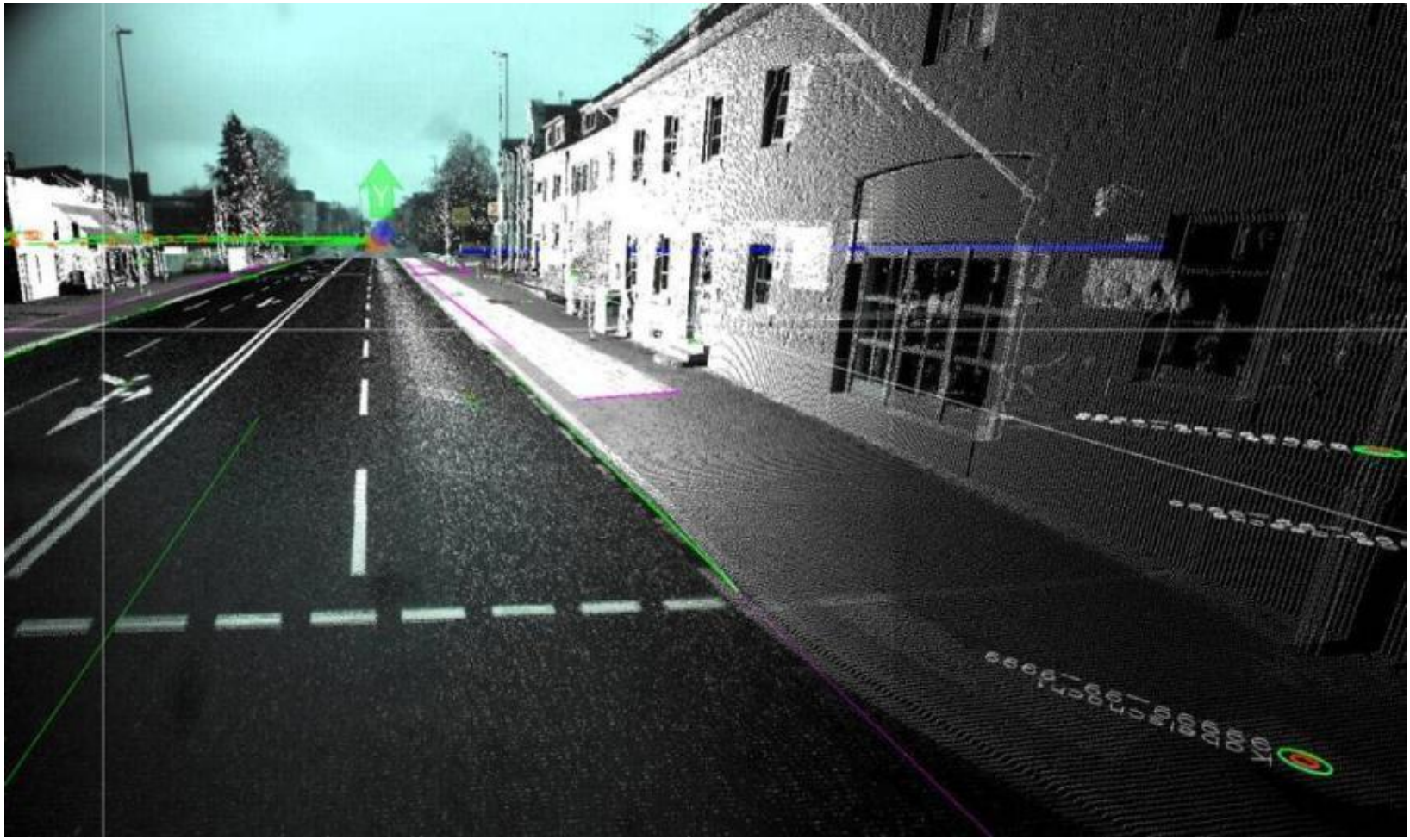




Highest accuracy for measurement

result:

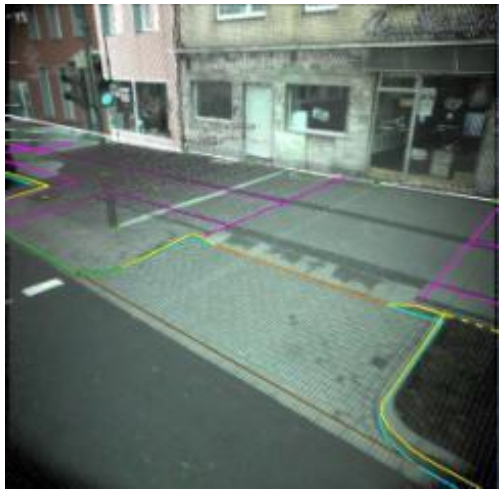
- Accuracy (absolut) 1cm at geodetic position and hight

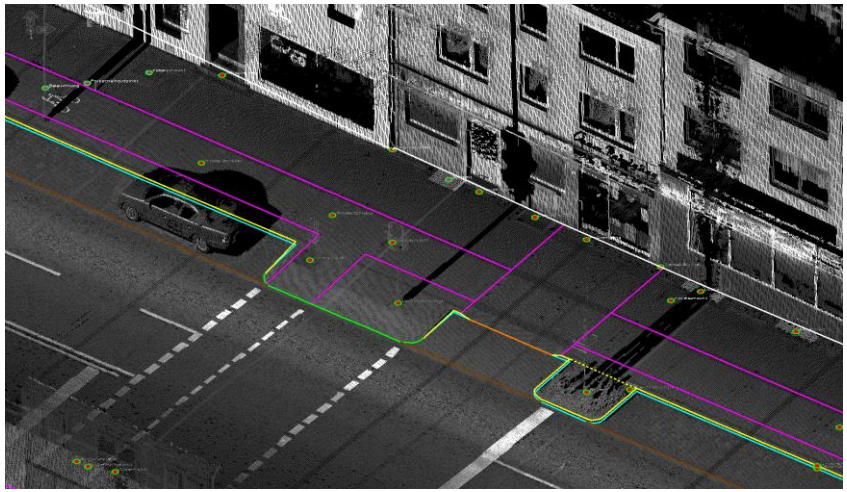
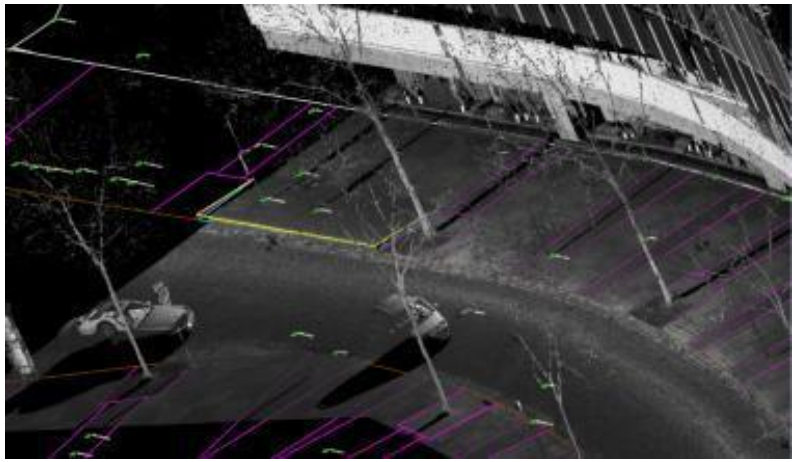
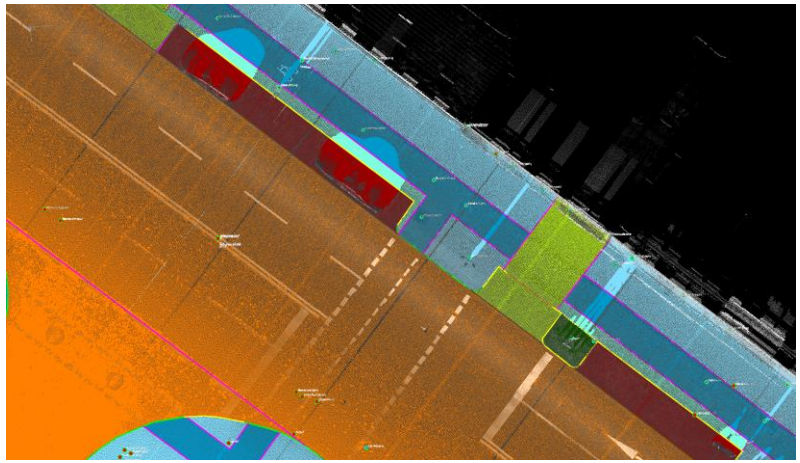


Highest accuracy for measurement

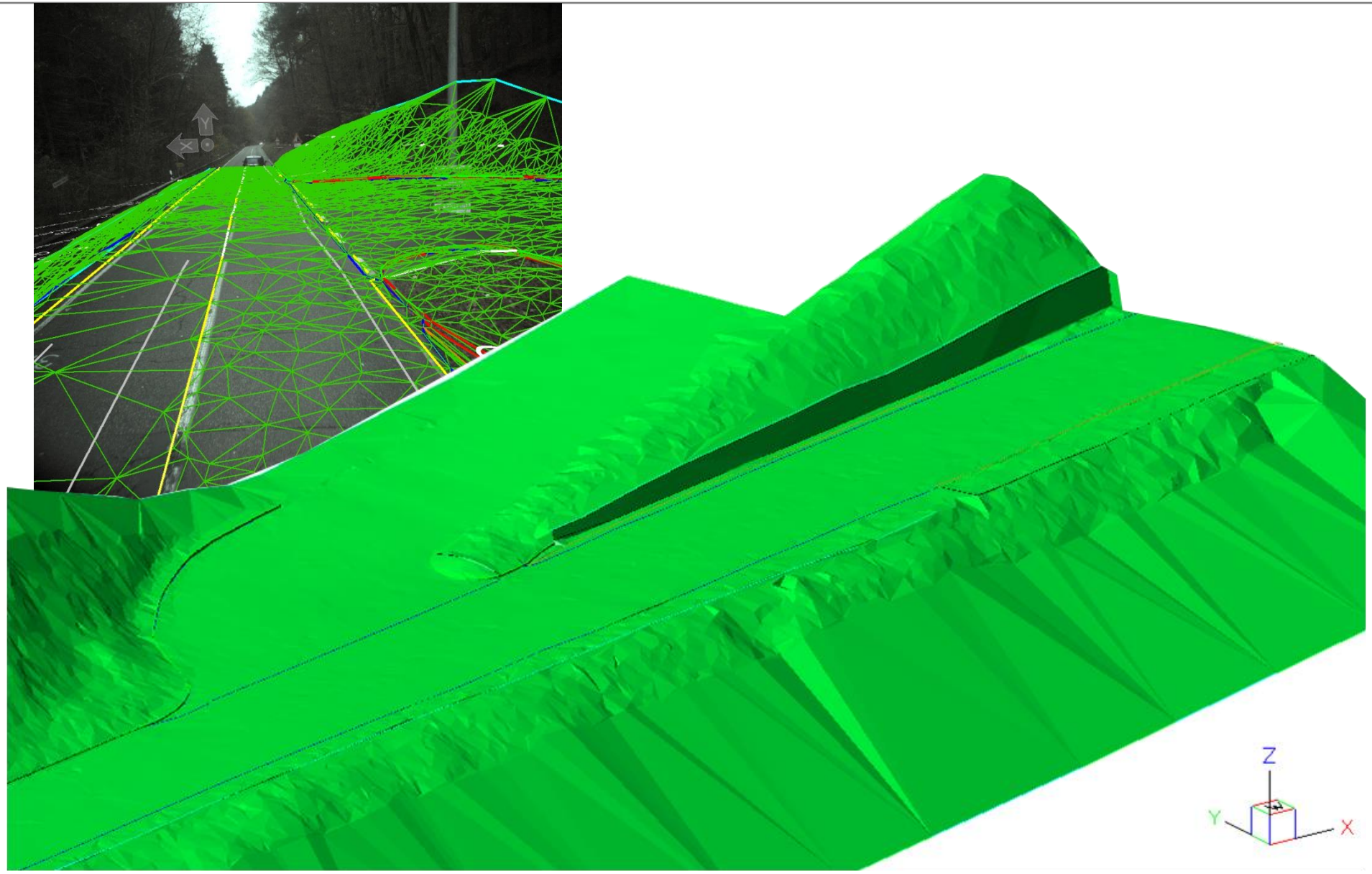
realisation:

- Combination of scanned data and stereo images



Digital ground model–3D



waterways – example Berlin

waterways – example Berlin

waterways – example Berlin

waterways – example Berlin

Detailed mass data

- Nav4Blind – new possibility navigation for blind people

Zeit online 25.04.2012

GEODATEN

Tock, tock, der Blindenlotse

In einem deutschlandweit einmaligen Projekt entwickelt die Stadt Soest ein Navigationssystem für Sehbehinderte. Es muss viel genauer sein als GPS.

Edip Kartal steht auf dem Soester Marktplatz und horcht. Er hört ein Klicken, wie das eines Geigerzählers. Dreht er sich nach Westen, wird das Klicken seltener, dreht er sich nach Süden, wird es häufiger. »Wenn es ganz intensiv knistert, bin ich auf dem richtigen Weg«, sagt Kartal, 30 Jahre alt und seit zehn Jahren blind. Mit seinem Smartphone testet Kartal einen digitalen Lotsen, der ihn durch die Stadt leiten soll bis zu seinem Ziel, dem Haus eines Freundes.

Weltweit finden Fahrzeuge mithilfe des Satellitennavigationssystems GPS zum Ziel – da müsste sich nach demselben Prinzip doch auch eine technische Hilfe für sehbehinderte und blinde Menschen bauen lassen. Ein Blinden-Navi. Seit Jahren wird das in der kleinen Stadt Soest in Nordrhein-Westfalen entwickelt.

Eine Initiative von:

KREIS SOEST

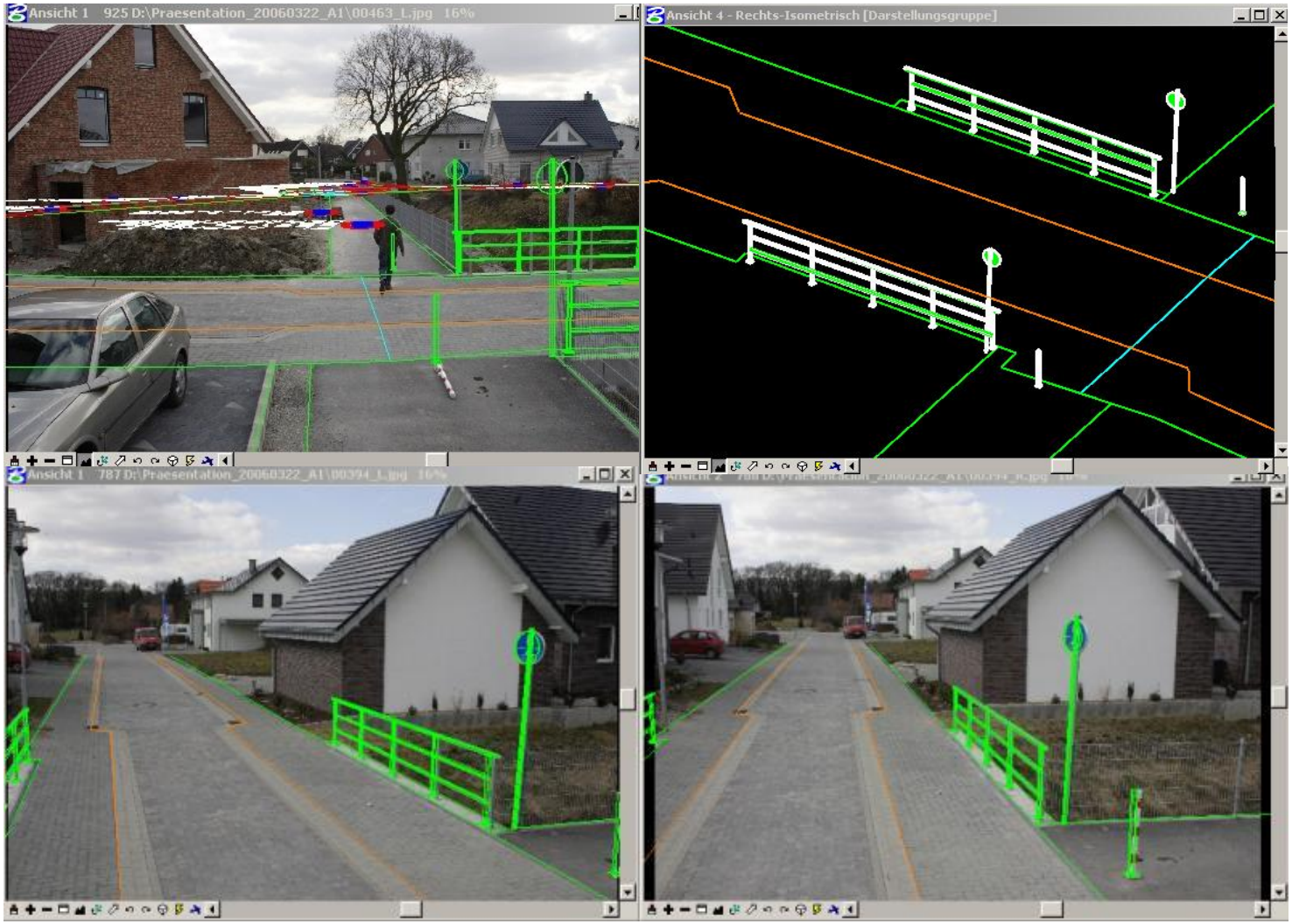
Gefördert von:

SIEMENS

T · ·Mobile

Detailed mass data

- Nav4blind



Eine Initiative von:

KREIS SOEST

Gefördert von:

SIEMENS

T · · Mobile

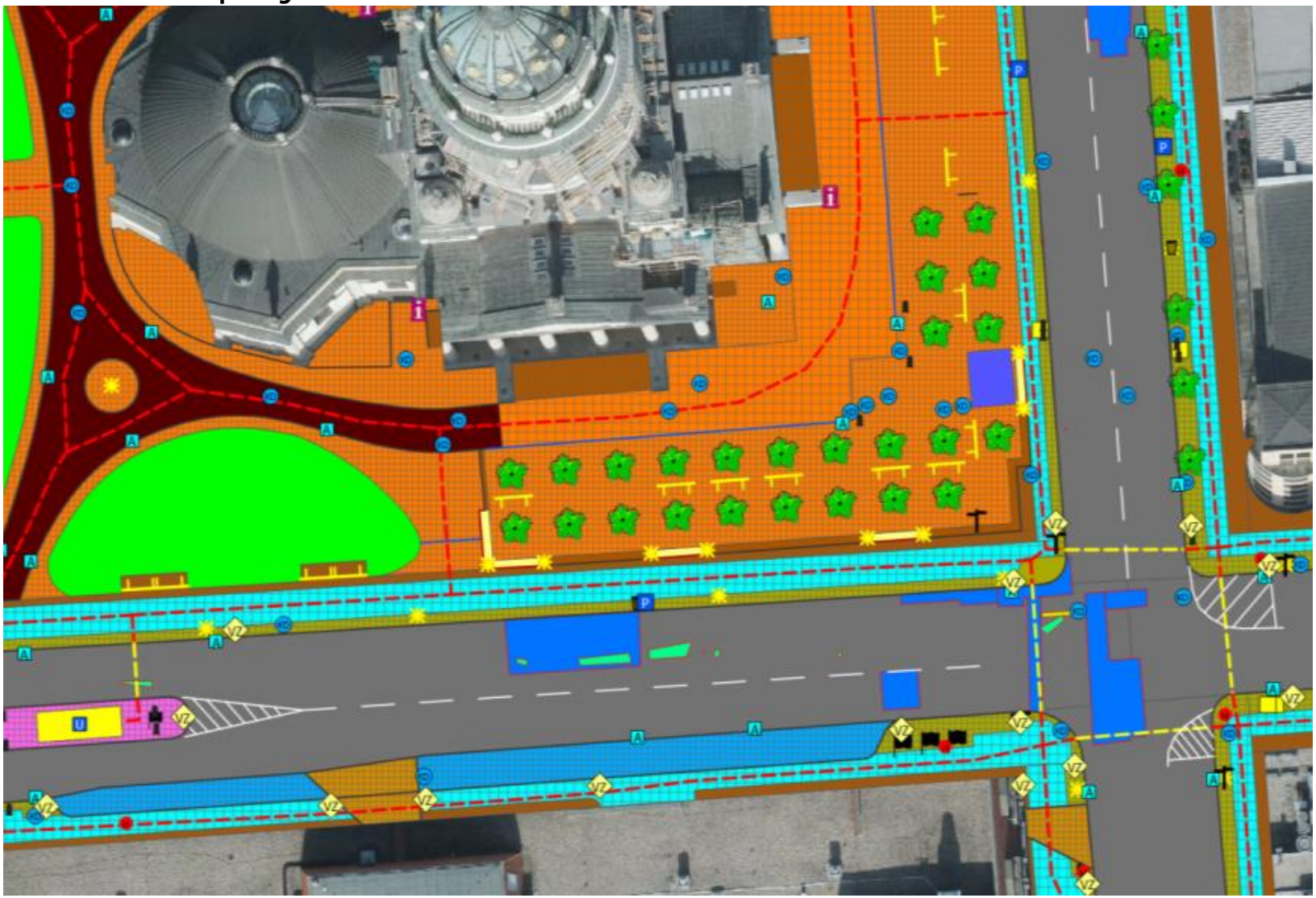
Detailed mass data

Guide4Blind

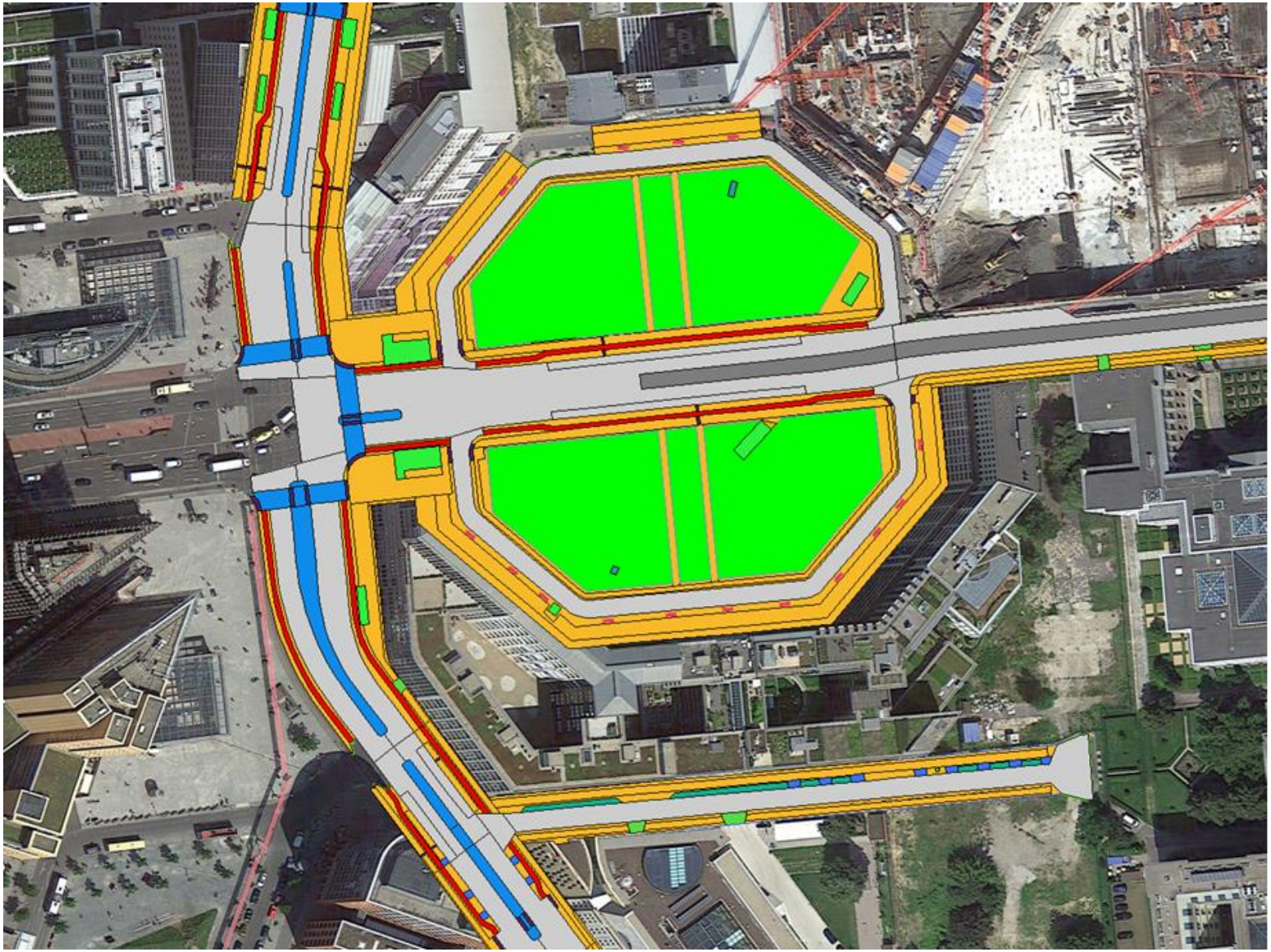
- First project for town Soest
- Mobile measurement of complete area with high precision
- Detailed with all information for blind people like tactile elements

Detailed mass data

- Second project at centre of Berlin



Detailed mass data



Detailed mass data

m4guide

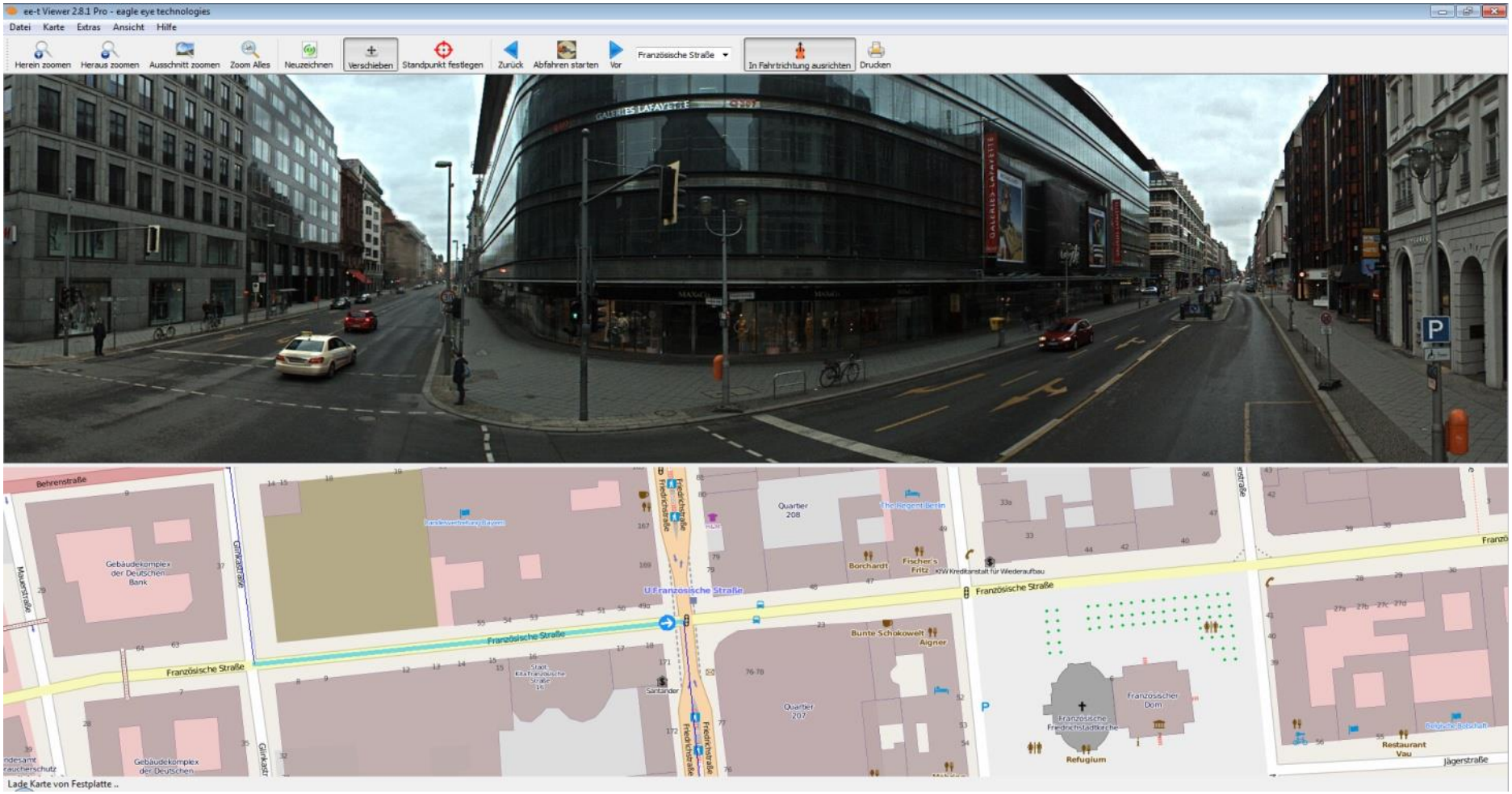
Outdoor Routing

KREIS SOEST

- Eagle Eye (links) vs. OSM (rechts)

Panoramic image

- Useable for routes
- High recognition factor



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Summary

- Precise – complete - economic
  - Complete Photo and Scan documentation
  - Capture of topographic road and condition data - complete and variable at accuracy
  - Establish high precision planning data
  - Complete survey fulfillment
- Analyse of road data
  - concepts for maintenance planning and forecast
  - financial data for maintenance and statements
- Minimisation of mistakes
  - Prevention of red fault error on maps/ plans, but the possibility to illustrate pictorial – like the human vision
- Our advantage
  - eagle eye technologies connects modern technology with long-time experience.

Summary

- Precise geometry out of images and scans
- Line based chainage not necessary (linienbasierte Stationierung)
- No schematised/fake data, but rather „real" areas
- spread data with unique quality (up to 1cm)
- Capture of all infrastructure data for different and several settings of task
- Capture of all possible road condition data
- Complete documentation of the roads (PMS)
- data migration independatly of GIS
- Exact book value for double-entry bookkeeping/ new local authority finance management

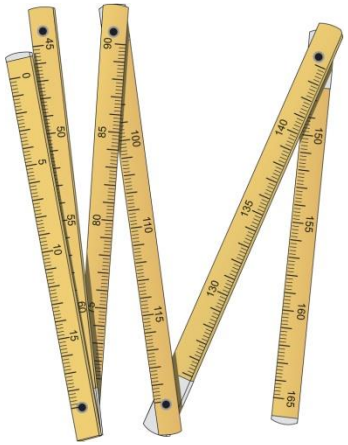
Summary

- efficient
  - detailed
    - economical
      - reliable

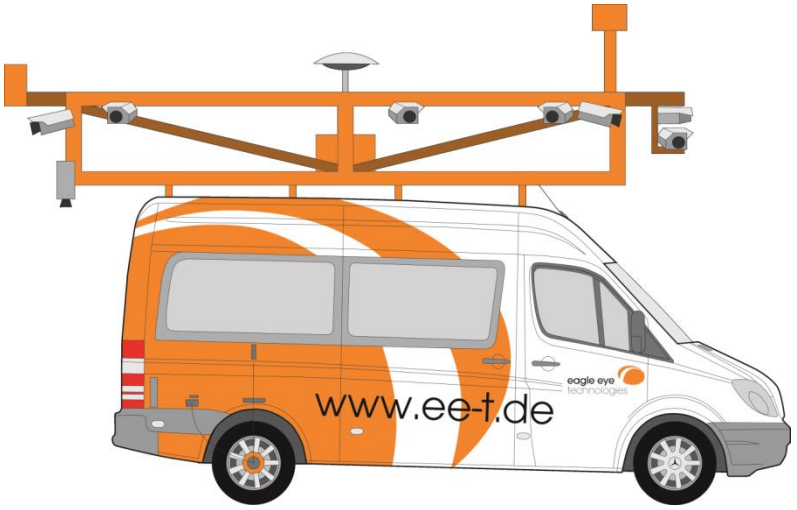
eagle eye technologies

- quick
  - precise
    - complete
      - contactless

Thank you for your attention!



… it works …



… but this works much better …

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