Experiences with Open Data – Open Systems – Open Acces – Open Education

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Interests in “Open Data – Open Systems – Open Access – Open Education”

As a scientist:

- Supervised 3 PhDs “Conflation of Geographic Data Sets” (ATKIS-GDF, ALK-GDF, ATKIS-OSM, …) since 1993), also in PPP (Bosch, Daimler, NMCA Stuttgart)
- Established the first professional testsite for Digital Airborne Camera Systems (Vaihingen/Enz, since 1995), most of the worlds camera systems have been certified using the data of this testsite.The testsite data are made open accessible.
- Collected many point clouds for heritage purposes: Berlin Brandenburg Gate, Churches and Chapels (indoor & outdoor) Abbeys etc – data are offered in open access
- Teaching of GIS courses in Berlin, Cairo, Egypt and Khartoum, Sudan – all lectures are videocasted and made accessible worldwide! (Open Course Work), use of QGIS (Open Source)
- Actually digitalization of Tech Heritage at Uni Stuttgart – the gyroscope collection (from the Bohnenberger Machine to MEMS IMUs)

As a consultant:

- To support initiatives in Open Data – Open Systems – Open Access – Open Education

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Open Data Conflation (between NMCA & OSM Data)

Stuttgart

Calw

ATKIS data

What is conflation?

the process of integrating geographical datasets, combini multisource data, improving data quality, and updating spatial information.

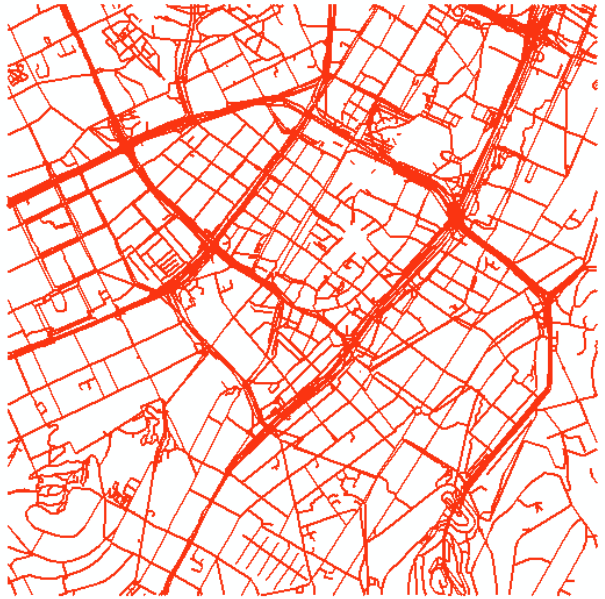
- Why conflation?

  conflation is an essential method to combine data collected by multiple associations

- Matching

  establish relationship between correspondence features in two datasets by Ifp software and Radius Studio (RS)

OSM data



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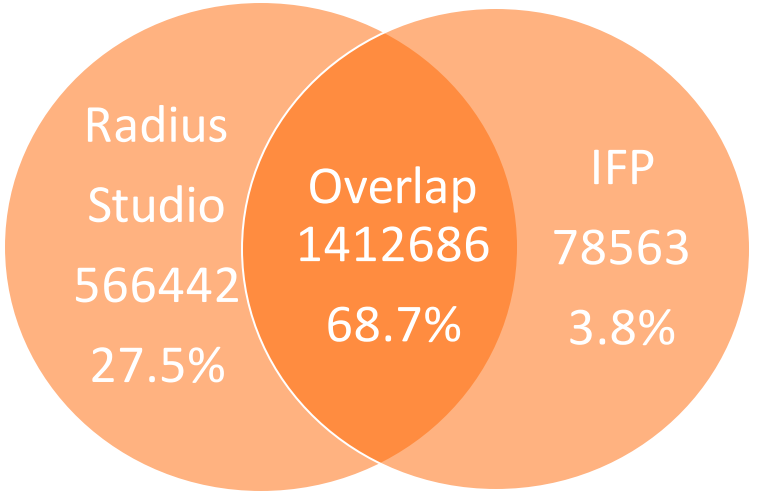
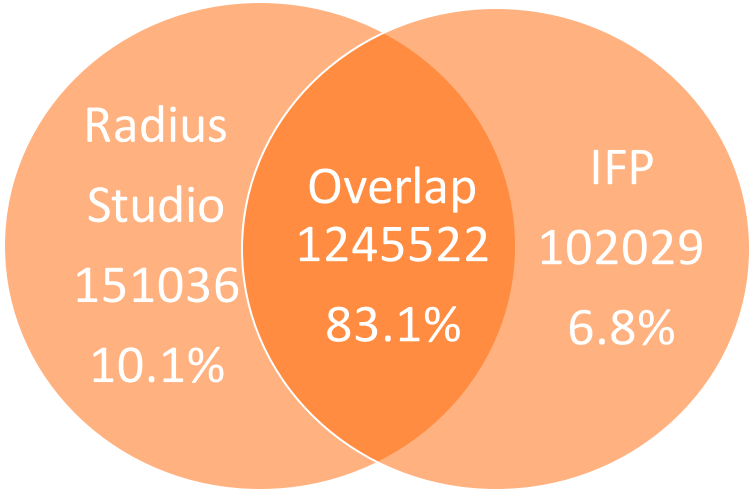
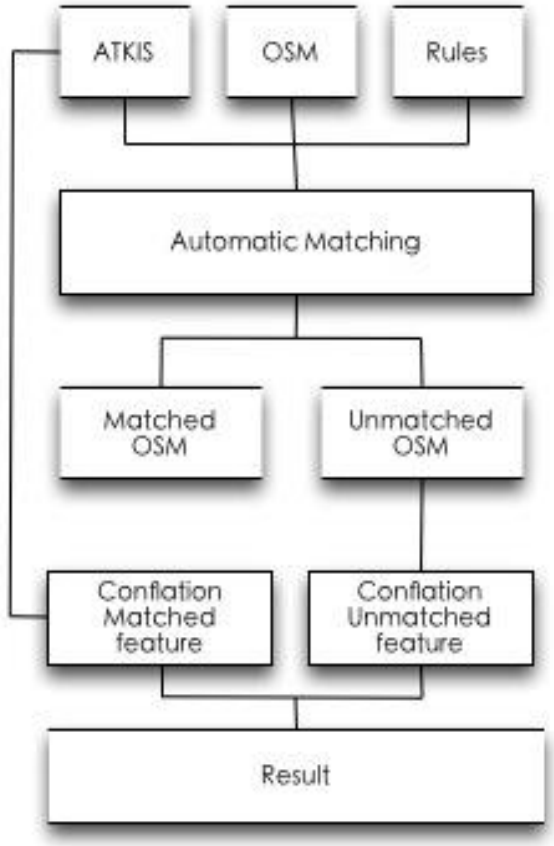
Open Data Conflation - Overlap analysis

- The overlap analysis including:
  - 10m buffer overlap for RS and ifp,
  - and the percentage of target 1m buffer within the reference 5m, 10m, and 15m buffers.



- Around 68.7% and 83.1% overlaps for 10m buffer in Stuttgart and Calw.
- The percentage solely covered by ifp buffer significantly less than RS.





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The ifp–Testgebiet Vaihingen/Enz for Airborne Photography (PPP ifp & Camera Vendors)

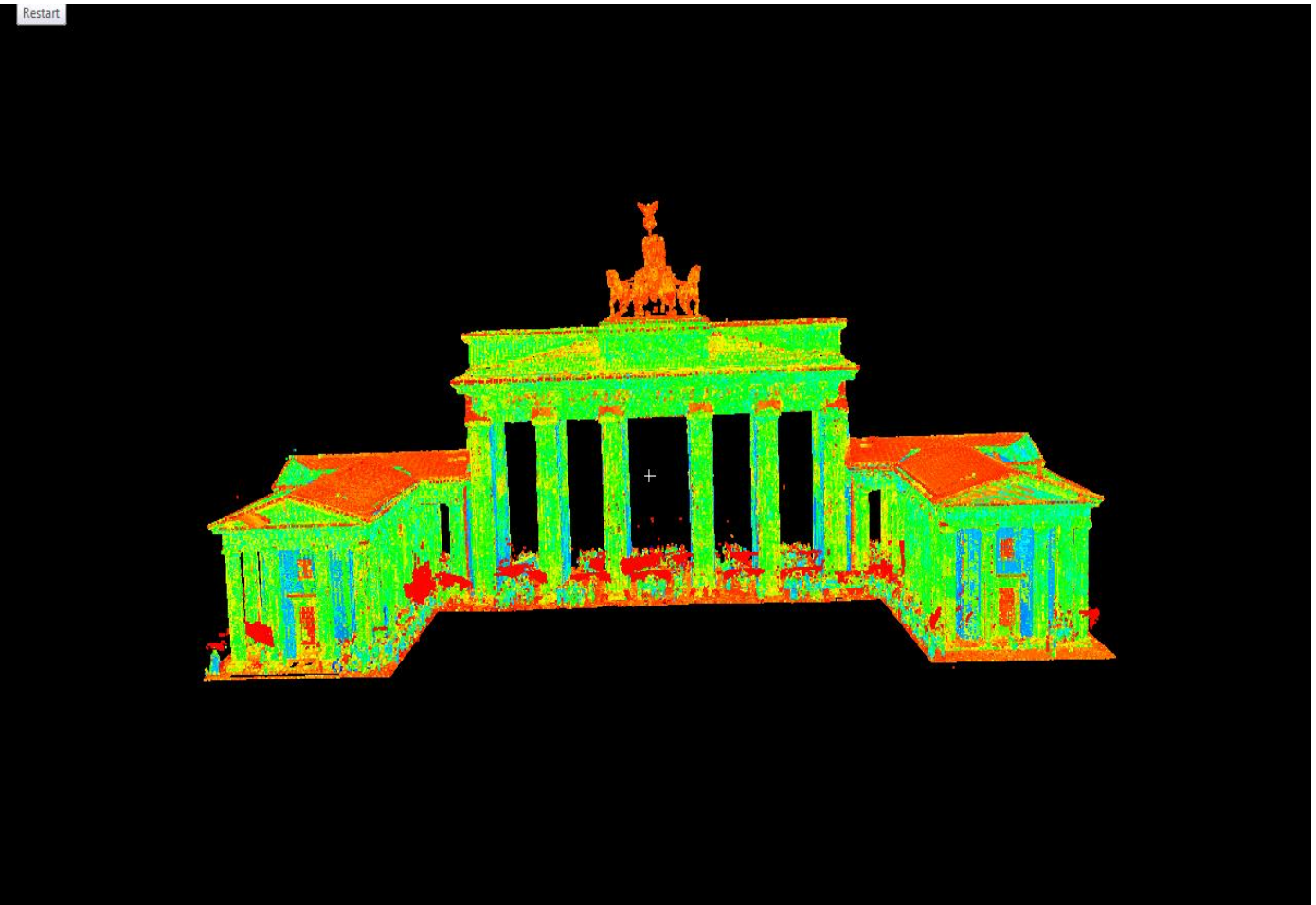
- about 200 coordinated control und check points (status 2007)
  - 172 painted signals 0.60m x 0.60m in the whole test site,
  - from that 103 painted signals 0.30m x 0.30m in densified region only
  - 67 natural points in the whole test site
- absolute accuracy of reference points s≤2cm from static GPS survey

ifp-Testsite Vaihingen/Enz (1995 – 2015) for Airborne Photography

Test flight	Sensor	Date month/year	GPS/inertial components
Digital line scanner	DPA	07/95, 08/96 10/96, 11/98	DPA – system specific
Digital line scanner	WAAC	11/97	WAAC – system specific
Digital line scanner	HRSC-A	02/98	POS/AV-510 DG, LR86
Analog camera	RMK-Top15	12/98	POS/AV-510 DG, LR86
Analog camera	RMK-Top15	06/00, 09/02	AEROcontrol-IId, IMU-IId
Digital Frame camera large format	DMC I	04/03	POS/AV-510 DG, AIMU
Digital line scanner	ADS40	06/04	POS/AV-510 AIMU / LN200, AEROcontrol-IId
Digital frame camera medium format	dIGIcam-K14	06/04	AEROcontrol-IId
Digital frame camera large / medium format	DMC, dIGIcam-H39	09/07	AEROcontrol-IId
4Head Frame Rollei	AIC4	12/07	Applanix POS/AV 510
DGPF DAC Test	several	06/08ff	Applanix, AEROcontrol

Comparison of TLS and Photogrammetry/CV – Berlin Brandenburg Gate (PPP CyArk &ifp)

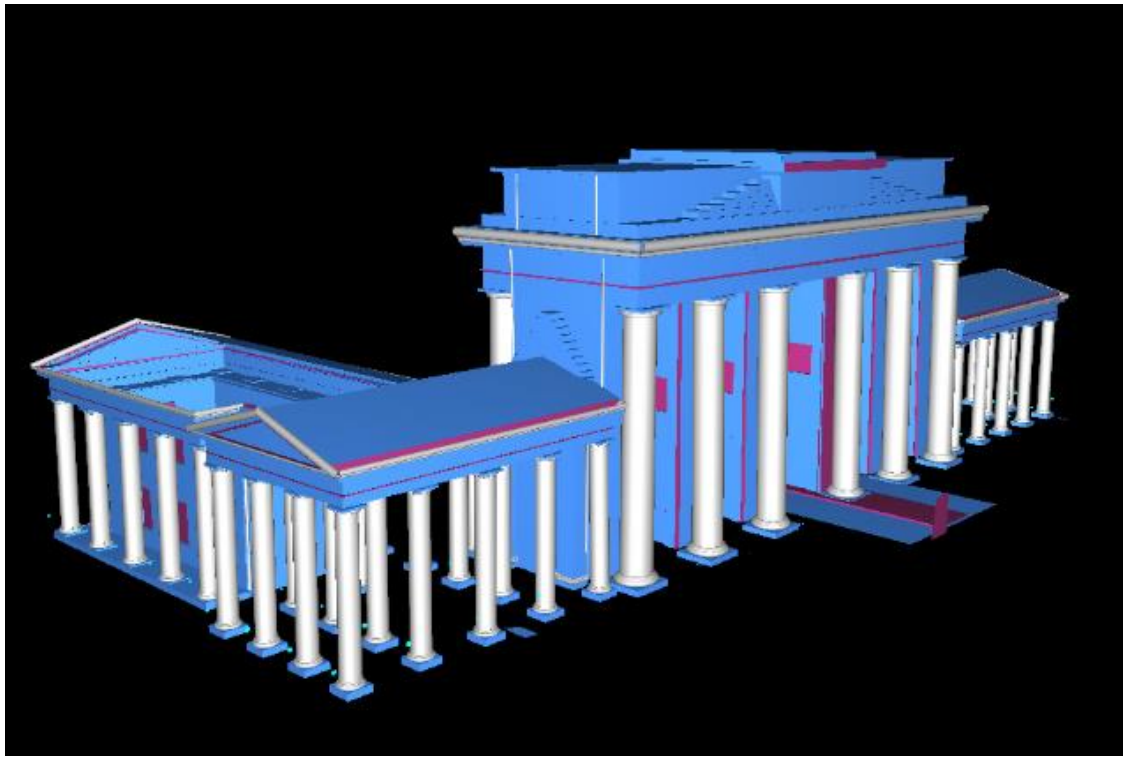
- Registered laser point cloud (243Mio points), System used: Leica ScanStation P20, 3d in the field, 85 scan station, approx 30Mio PpS

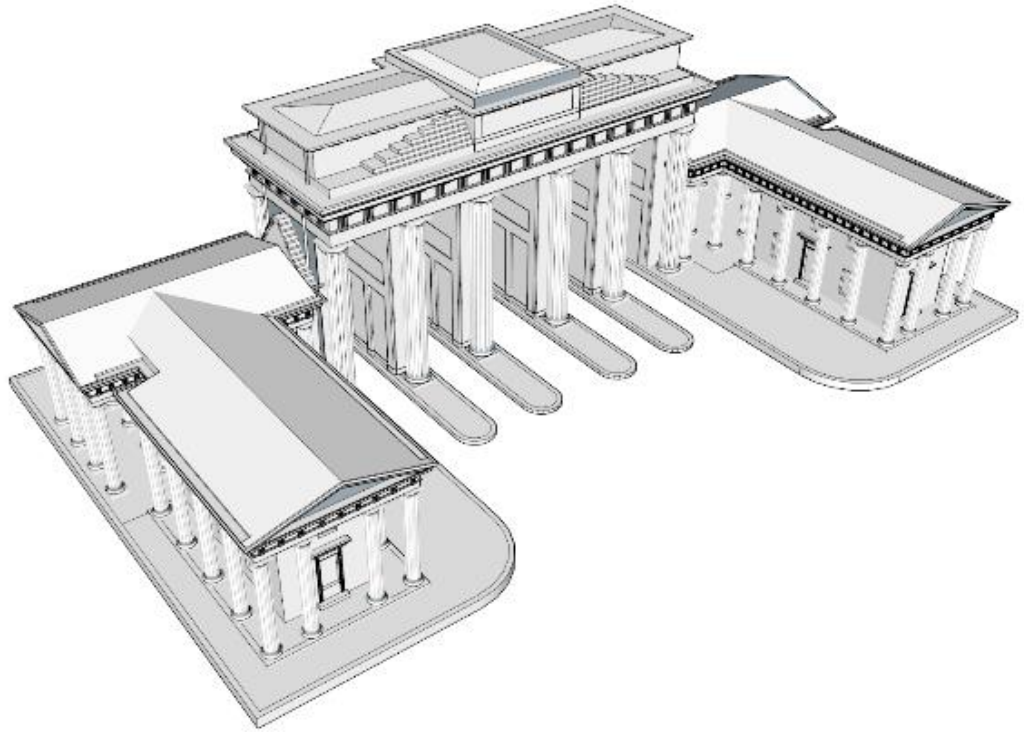


Comparison of TLS and Photogrammetry/CV - BBG

3D vectorisation and modelling

- Two software packages were utilised:
- Leica Cyclone and Trimble SketchUp
- Manual production of a 3D model with basic geom.





BBG Results Photogrammetry/CV

Dense point cloud (about 180Mio points)

Low polygon photogrammetric model

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Virtual Reality App CalwAR (iOS, Android & Windows) – Open Data available through City of Calw)

Summary and Outlook

- Open Data – Open Systems – Open Access – Open Education is very important – all contributors will win
- Standards, Licensing and Business Models must be further developed
- The Developing countries need OpenXXX, sometimes it is the only source for their geospatial developments and education
- Data Servers all around the world should collect geospatial data for digital preservation, data improvements, feature extractions and information modeling.
- Many methods of AI and Deep Learning work well with geospatial data, but data are not there
- I personally like standards like ASCCI: *.txt, *.tex, *.las, XML→UML→HTML→CityGML etc, because of sustainability

Example 1: ASCII Latex of 1989 (Habil Thesis D.Fritsch)

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\textheight=25.0cm
\topmargin=-0.25 cm
\headsep=5mm
\oddsidemargin=0.3 cm
\footskip=10mm
```


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