

On the Road

Using Remote Sensing Data to Prospect the Via Regia

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Abstract: Ancient roads are important components of the cultural heritage, but documentation of them is often insufficient. While on-site prospection of terrain is expensive and time consuming, modern GIS technology and high resolution remote sensing data allow to prospect large regions at the desktop. About 400 km of ancient roads, assumed to be part of the Via Regia, were studied in this way. Many visibly preserved remains, just like hollow ways or crop-marks, were documented. The method supports the practice of heritage protection not only for small project regions but state wide for the entire region of Saxony.

Keywords: archaeological prospection, remote sensing, via regia, heritage protection.

Ancient roads are important components of the cultural heritage. Preserved remains have to be protected as monuments. But the documentation is often insufficient, because historical sources frequently deliver only topological features without specific route descriptions.

The evaluation of ancient maps without GIS is hard and tricky. On-site prospection of terrain is expensive and time consuming. But modern GIS technology and high resolution remote sensing data brought a change. Ancient maps can be georeferenced with reasonable effort and evaluation of remote sensing data (DTM, DOP, CIR) replaces on-site prospection. Prepared in this way it is possible to prospect even large regions from one's desk with reasonable effort. In this manner long distances of ancient roads were studied and identified as part of the Via Regia.

Using ArcGIS 10 we had easy access to the following layers:

- Meilenblätter von Sachsen (historic map from about 1800)
- Shaded relief (DTM)
- Digital orthophoto (true colour)
- Digital orthophoto (CIR - colour infra red)
- Vegetation index (NDVI – normalised difference vegetation index)

The route of Via Regia is topological well known. The historic map Meilenblätter is the first very accurate map of Saxony and helped to identify potential specific routes on the map. Along these routes the other layers were examined carefully. As result all layers showed specific ancient remains of the route:

- Shaded reliefs indicate best in wooded areas, where relief structures are normally hidden by leaves. Outside the wood this structures are mostly well-known. (Fig. 1, 2 and 3)

- True colour orthophotos sometimes show crop or soil marks and structures that are preserved over time. (Fig. 2 and 3)
- CIR orthophotos accentuate vegetation, among them some crop marks are better visible. But this doesn't work in wooded areas. (Fig. 3 and 4)
- Vegetation index enhances differences in vegetation features, some structures become more clearly. As with CIR this doesn't work in wooded areas. (Fig. 3 and 4)

The result is a documentation of visibly preserved remains from ancient roads, just like hollow ways or crop-marks. About 660 km of traditional routes were prospected and 49 places with clearly visible traces of the route were detected and documented. Many tasks of on-site survey could be replaced by techniques of remote sensing using GIS. The duration of this project was less than two months, including introductory training.

Most details of the methods applied are well known, but falling prices allow the application even with rather low budgets. The method supports the practice of heritage protection not only for small project regions but state wide for the entire region of Saxony.

References

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MEILENBLÄTTER. *Meilenblätter von Sachsen*. Berlin exemplar, acquired 1780-1806 at the head of Friedrich Ludwig Aster. Online as geographic data service: <http://geoinformatik.htw-dresden.de/cgi-bin/mb/>. © Staatsbibliothek zu Berlin - Preußischer Kulturbesitz,

ATKIS-DGM2. *Digital Terrain Model*. Archaeological Heritage Office of Saxony (internal data). © Staatsbetrieb Geobasisinformation und Vermessung Sachsen.

ATKIS-DOP (RGB) *Digital RGB Orthophoto*. Online as geographic data service: http://www.landesvermessung.sachsen.de/ias/basiskarte4/service/SRV4ADV_P_DOPRGB/WMSFREE_TK/wmsservice. © Staatsbetrieb Geobasisinformation und Vermessung Sachsen.

ATKIS-DOP (CIR) *Digital CIR orthophoto*. Online as geographic data service: http://www.landesvermessung.sachsen.de/ias/basiskarte4/service/SRV4ADV_P_DOPCIR/WMSFREE_TK/wmsservice. © Staatsbetrieb Geobasisinformation und Vermessung Sachsen

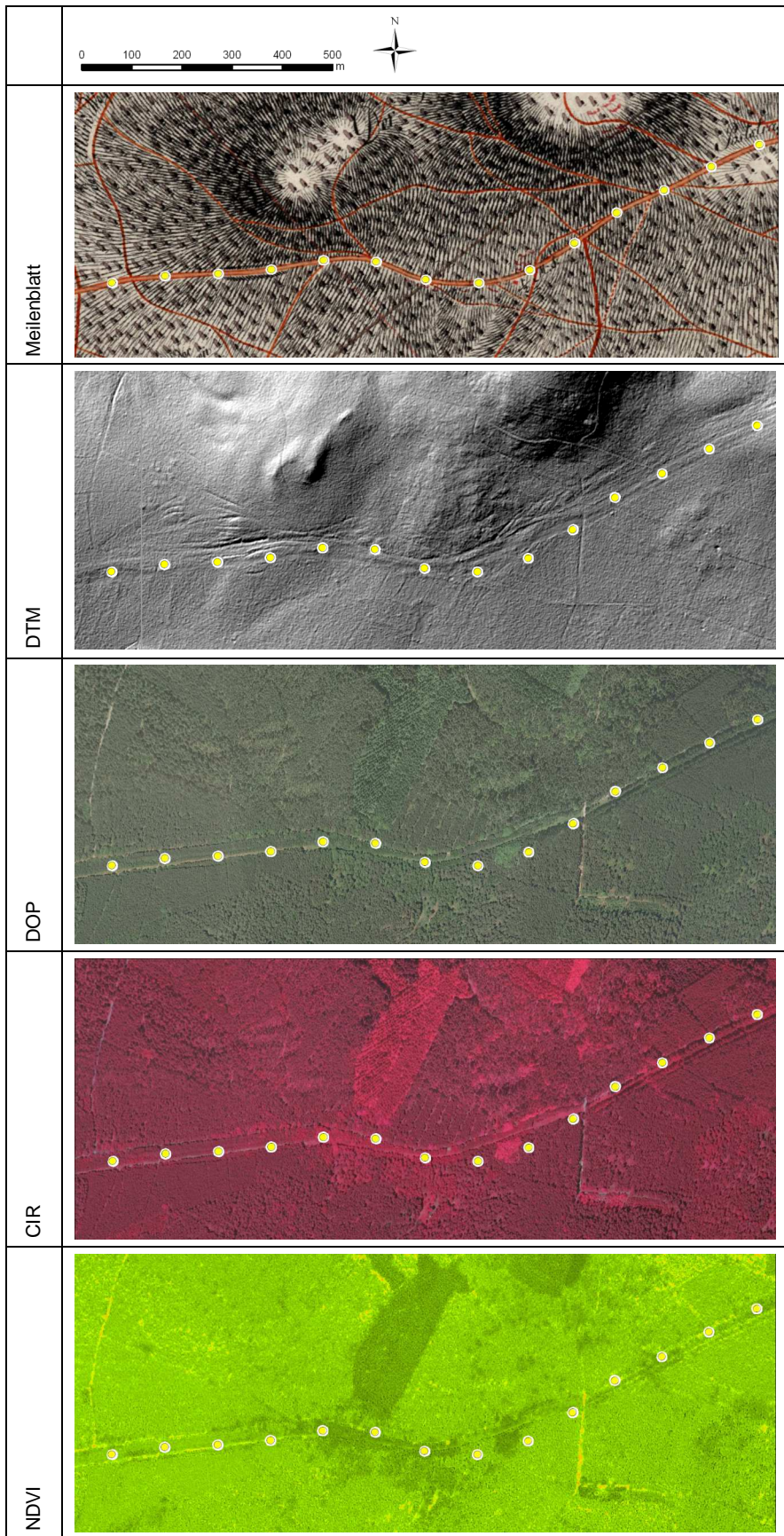


Fig. 1 – Post road Königsbrück – Kamenz, southwest of Schwosdorf (Schönteichen, Bautzen).

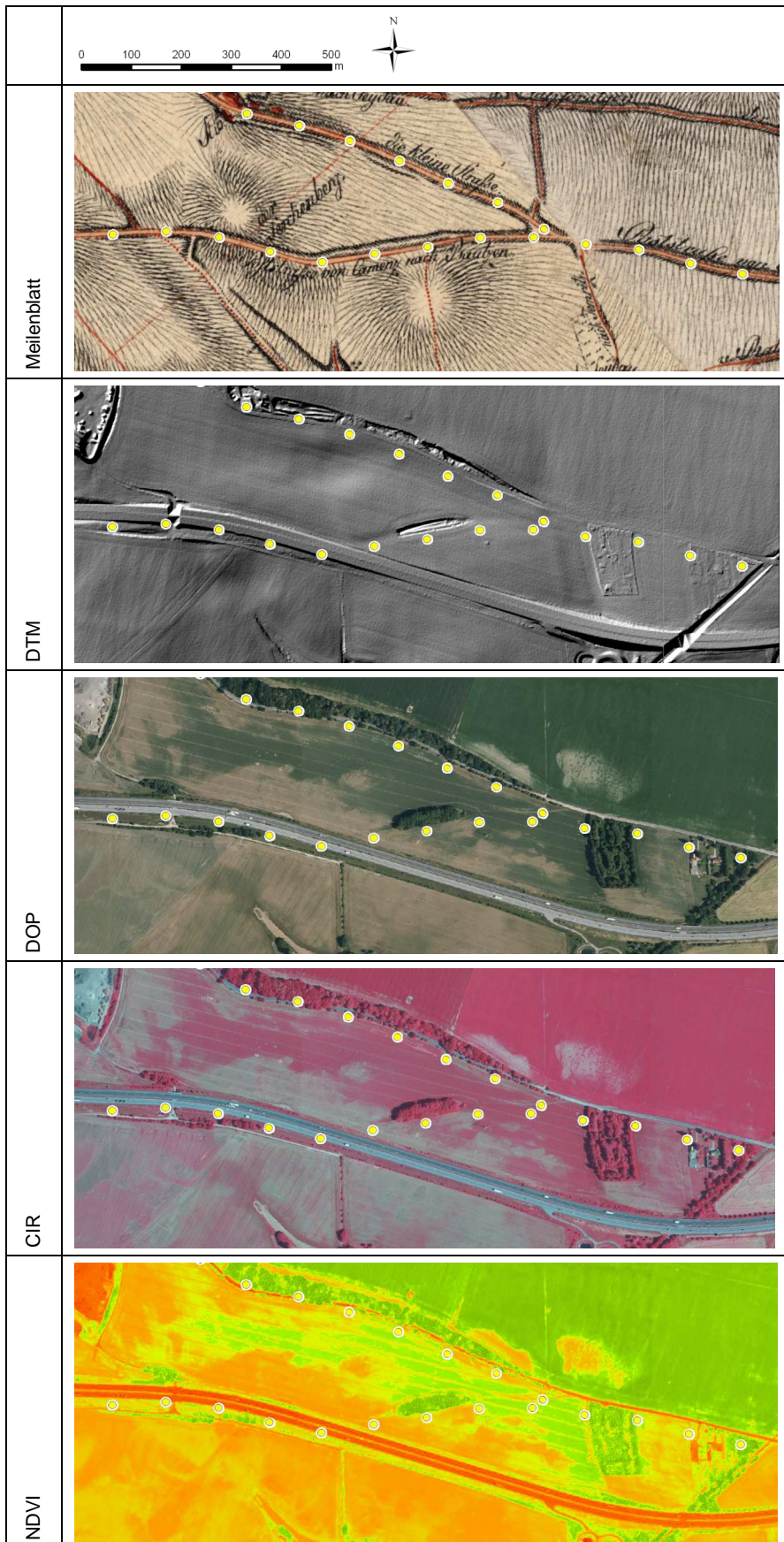


Fig. 2 – Post road Kamenz – Bautzen, west of Seidau (Bautzen).

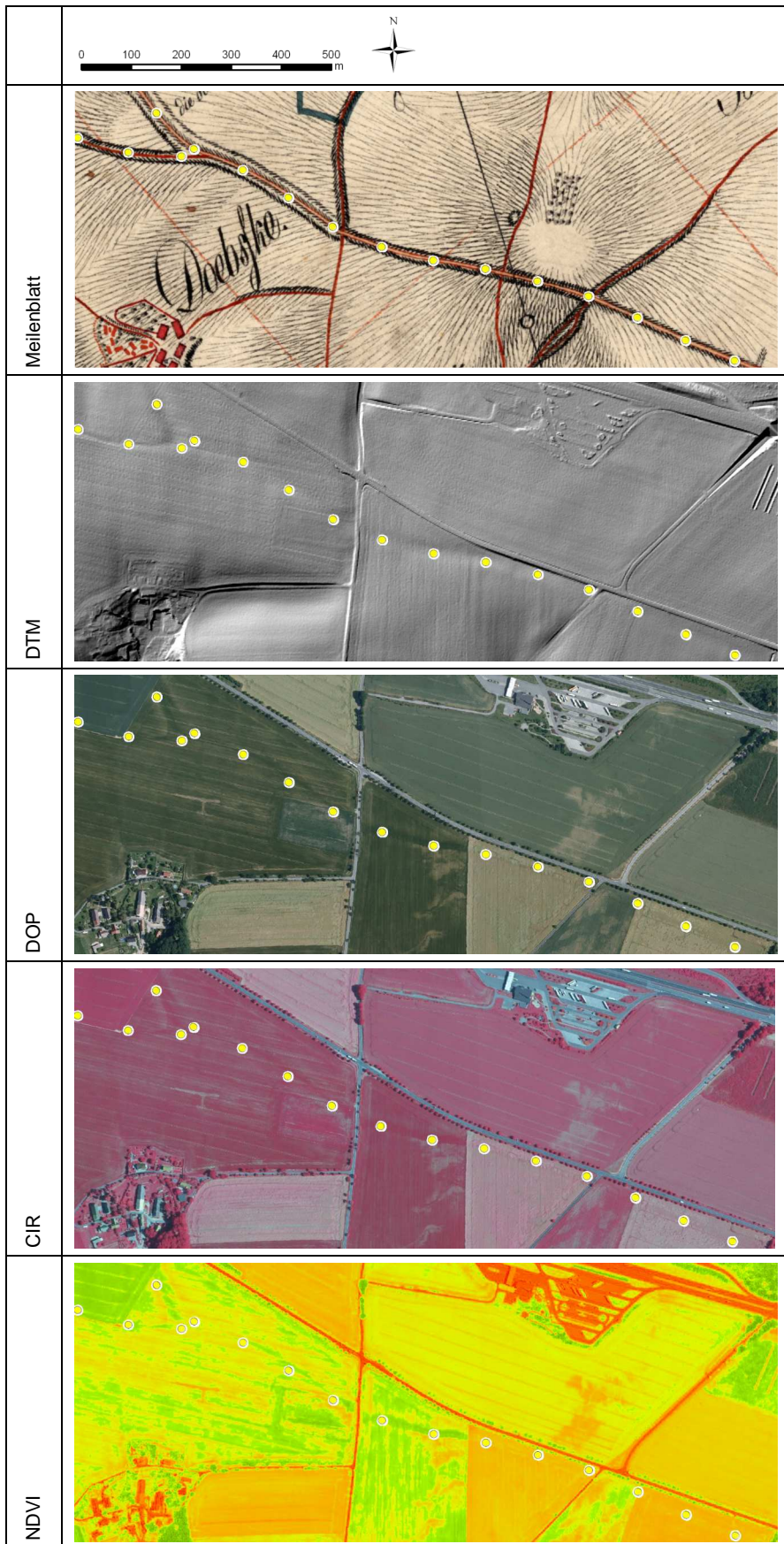


Fig. 3 – Post road Kamenz – Bautzen, north of Döbschke (Göda, Bautzen).

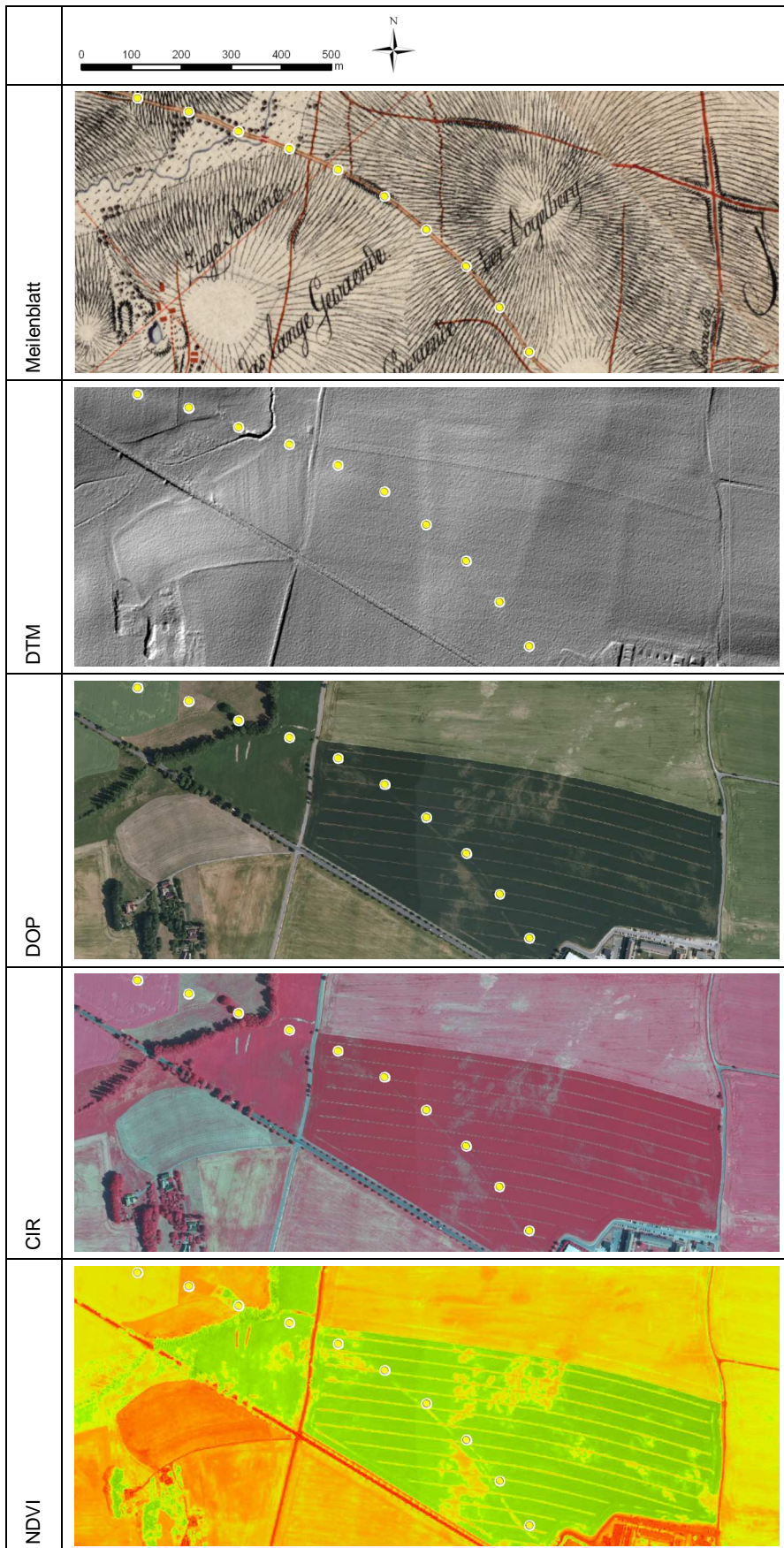


Fig. 4 – Post road Kamenz – Bautzen, north of Panschwitz (Panschwitz-Kuckau, Bautzen).