UrbanMetaMapping (UMM) Transfer phase
Kick-off workshop 13–14 January 2024, Bamberg University

Background

One of the outputs from the BMBF-funded UrbanMetaMapping (UMM) project was to create a collection of historical thematic city maps of WWII and its aftermath for Central Europe with the view of further exploring, comparing them and making them accessible for further research in the field of Spatial Humanities.

The UrbanMetaMapping Transfer (UMM-Transfer) phase (2024-25) is a one year BMBF-funded project, following up from the success of UrbanMetaMapping (2019-2024) aiming to disseminate the findings of UMM to diverse international research and practice communities. The objectives of (UMM-Transfer) are:

- To establish an international research network for methodological innovation in the field of "Spatial Humanities and Heritage", raising awareness of historical maps as an important resource.
- To make available the historical maps annotated, digitised and vectorized in the main UMM phase as training data (open data).
- To explore cartographic machine learning methods and methodological approaches to data analysis from historical maps using GIS, in collaboration with the international spatial humanities community.

Workshop content

The kick-off workshop was the first event of the UMM-Transfer phase with international experts. In addition to the 4 organisers from the University of Bamberg, 11 participants from various institutions participated in two half-days, presenting their perspectives and discussing different approaches to historical map archiving, digitisation and analysis.

Thomas Gunzelmann presented work based on an article by J.K. Rippel (1961) (doi:10.2307/520249) as an example of how the exploration of the historical process of dividing fields and plots around villages over generations can lead to a deeper understanding the rural development in German and beyond.

Angelika Lampen presented the work on the Historical Towns Atlases, a European effort, and the Deutscher Historischer Städteatlas, coordinated by the Institut für Vergleichende Städtegeschichte in Münster/Germany. So far, more than 600 atlases have been published internationally. The atlases feature (historical) source maps and thematic maps documenting and analysing historical developments. Some of the maps can be accessed as interactive resources, such as a damage map of Magdeburg from 1945.

Carol Ludwig presented the major findings from two publications of the UMM subproject *Sozialkartographie*, looking at the diachronic effect of bomb damage on the urban heritage of Nurenberg and the implications on the spatial distribution of the social fabric of Essen.

Anna-Lena Schumacher presented the joint German-Polish research project HisMaComp.

Anastasios Kesidis and Kleomenis Kalogeropoulos gave a joint presentation discussing automated methods for "object recognition" in historical topographic maps and processes for capturing manually spatial information depicted in cadastral maps.

Dominik Kremer presented a range of Digital Humanities methods that allow the addition of depth on digital maps, by adding information from social media and volunteered geographical information.

Walter Bauernfeind presented the research project on "Historische Topographie Nürnberg" that can be accessed through the online catalogue of the Stadtarchiv Nürnberg.

Niklas Alt presented the software stack of the Hessian Institute for Regional History and their work on topographical maps, the Historical Atlas of Hessen, the Historical Statistical Information System, Historical Cadastral Maps, and the data standardization group for the Digital Historic Town Atlas.

Klaus-Peter Wenz provided insight in his work as Coordinator for the Geodata Infrastructure of Germany to ensure that Germany's geospatial data remains compliant, accessible, and interoperable with the EU's standards. Data resources can be found at geoportal.de, for more information see GDI-DE and the "Praktischer Leitfaden - Import und Anzeige von Metadaten im Geoportal.de" which also cites the relevant ISO standards (ISO/TS 19139-1:2019, ISO 19115, ISO 19119) for metadata and services.

Xuke Hu presented a range of methods for extracting information from natural language texts, by geoparsing toponyms from different online sources.

Carmen Enss explained how thematic city maps documented bomb damage to cities and disaster management. Such maps show bomb damage or devastated urban areas, but also for example rubble clearance progress or parts historic buildings, surviving façades, statues or other works of art in preparation for their statical stabilization or recovery from the ruins. She also presented the researchers of the UrbanMetaMapping research consortium (2020-2024). Publications from the consortium can be found through UMM website. Maps for Essen, Freiburg im Breisgau, Hamburg, Hannover, Leipzig and Nürnberg have been edited and are in open access in pdf through the Atlas of War Damage Maps/ Atlas Kriegsschadenskarten Deutschland (doi:10.1515/9783035625011). More maps have been collected on a research platform hosted by the University of Bamberg. Some will be shared online in 2025.

Klaus Stein presented the Nürnberg GIS dataset which provides a fully vectorized base map (1942) of the Nürnberg old town enriched with information from thematic maps depicting the

heritage value of buildings, or the damages from air raids. The dataset will be available and published as open data.

Seraphim Alvanides presented the aims, objectives and research/networking programme of the UMM Transfer phase planned for 2025.

Workshop outcomes

Two major areas of interest were identified through the workshop:

Research Data Management (RDM) of historical maps as research artifacts

Some historical city maps, both topographical and thematic maps, appear as scanned versions on geoportals and archival or library catalogues. To make them accessible for interdisciplinary research, these steps can be done in the future:

- Agreeing on conform cataloguing standards in historical description and metadata
- Forwarding / harvesting geodata to national and European portals
- Develop strategies for vectorizing historical cadastral maps and thematical maps
- Linking maps made by historians to the scanned source maps for reference

One major aspect discussed in this area of interest was the accurate recording of metadata, not only the "signature" of the original maps as historical documents provided by each archive, but also additional information that is important for understanding maps, such as producer/designer, map scale, basemap, legend details, projection system etc. One additional challenge highlighted with vectorised maps is storing the metadata associated with the original maps in the vector layer. This points to a well-designed system for storing metadata from historical maps alongside their digitised products.

Digitising historical maps with the view of performing spatial analysis

Throughout the meeting there was consensus that scanning and georeferencing of historical maps is extremely important for Spatial Humanities, but not sufficient for addressing complex research questions. Examples of historical maps "overlayed" on top of other geographical layers, such as historical aerial photographs or contemporary maps were presented by some participants. However, it became clear that such visual inspection can generate complex questions that can only be addressed through spatial analysis within a GIS environment. In order for such analysis to be undertaken, it is then necessary to capture and store the information presented in the scanned maps in the form of "vectors". Such a vectorisation process is time consuming when undertaken manually and the workshop participants discussed ways of capturing the information automatically or at least semi-automatically. The discussion converged on three major types of information that needs to be captured:

- **Textual** information available on the maps (e.g. placenames, street names, memorials).
- **Outlines** of buildings/structures from the same or similar basemaps used extensively.
- **Thematic** information drawn in colour on top of the basemaps (e.g. level of destruction, historical value of buildings, land use or landcover etc.)

There was also general agreement that it is very hard to capture automatically the thematic information (e.g. from damage maps) due to a number of issues identified: distortion of the original/scanned maps, inconsistencies with the colours originally used, differential fading of colours, colouring not matching exactly the building/structure outlines, use of symbols alongside colouring, overlaps with text etc. Given the extensive use of the same or similar basemaps for the recording of thematic information, it was suggested that it would be easier to vectorise the original basemaps (automatically or semi-automatically). The thematic information depicted on the maps can then be captured at a follow-up stage (automatically, semi-automatically or even manually, if necessary).

All these aspects will be explored by organising and running a "Community of Practice" (CoP) that will experiment with automatic vectorisation of basemaps and capture of thematic information from historical maps

Finally, there was general agreement that vectorising historical maps should be undertaken alongside discussions on the research questions that are being asked and the methods that can be applied for addressing such questions.

Next steps

- An online event inviting all the workshop participants alongside those who could not attend the kick-off and other interested stakeholders. This is planned for **the week of 24th February.**
- Organise and make available online materials (basemaps and thematic maps) for the CoP.
- Propose a workshop or parallel session for presentations from the CoP at the EUROGEO conference 16-17 May 2025, Skopje, North Macedonia. Submission of Session Proposals: **January, 25th 2025** https://www.eurogeography.eu/conferences