57. Development of a Historical GIS of the Bologna's Medieval Towers

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This work presents the development of a Historical Geographic Information System (HGIS) for the spatial and temporal analysis of Bologna's medieval towers, which constitute a distinctive feature of the city. The research addresses the challenge of reconstructing a largely transformed architectural system whose surviving structures represent only a fraction of the historical phenomenon. The study used a corpus of 100 towers, whose historical existence was established through cross-analysis of bibliographic, cartographic, and documentary sources, as the basis for the system. Historical maps dating from the sixteenth to the nineteenth century were georeferenced within a common projected reference system and critically assessed according to their geometric characteristics and correspondence with the present urban fabric. In parallel, a structured database was created to manage spatial, chronological, architectural, and historical information for each tower. Particular attention was devoted to positional and temporal uncertainty, especially for disappeared towers whose locations are often inferred from indirect references such as buildings, streets, intersections, or historical toponyms. The integration of georeferenced cartography and the tower database within a GIS platform enabled the validation of existing coordinates, the correction of inconsistent locations, attribute-based analysis, and the diachronic visualization of tower appearance, persistence, transformation, and disappearance. The resulting HGIS, still in development, therefore, moves beyond a static inventory and provides a critical framework for interpreting Bologna's towered landscape through space and time. The approach demonstrates the potential of geomatics for integrating heterogeneous historical sources while preserving different levels of data reliability and offers a transferable methodology for the study of lost or substantially transformed urban heritage.