

New work on the plan of Aquileia based on aerial photographs and a GIS platform

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A joint research project at the Civici Musei of Udine and the Dipartimento di Informatica at the University of Udine has created a software platform to collect, catalogue, archive and compare data on the ancient city of Aquileia (fig. 1). The present article intends to summarize some of the new insights relating to traces of buried structures and their possible interpretation, in the context of previous work on the plan of the city.

We designed a software system named Antaeus, a GIS that is a node of the Internet open to shared access by the users and capable of actively exchanging data with other sources on the Net. The first step was the design and realization of an open GIS platform. Next, a set of digital aerial images covering more than 1000 km² and taken in both the visible and NIR (near-infra-red) multispectral bands by the regional government of Friuli-Venezia Giulia was loaded and geo-referenced. This allows for a first, large-scale analysis of the data. In the future we plan to perform geophysical surveys at smaller scales in the areas where the large-scale analysis has provided promising results.

Earlier plans

The first overview of Aquileia dates to the late 17th c.: ancient ruins are interspersed with mediaeval and contemporary buildings. Then in the mid-18th c. Gian Domenico Bertoli attempted to make an outline of the archaeological map of the town centre. A new attempt was made in the Napoleonic era, and another in the second half of the 19th c. During the 20th c. several maps were proposed, starting with the one by G. Brusin, which was updated until the 1950s, up to the most recent one (2003) by L. Bertacchi¹ (fig. 2). All of these maps suffer from limitations since the picture as a whole had been created by assembling surveys and plans produced after each excavation that were not always precisely positioned. Oblique aerial photographs were taken in 1934, 1954, 1982 and 1990 (the latter in colour for the first time), but efforts were not made to analyse the images systematically or to correlate them with the available data so as to update the map of the Roman city in a comprehensive manner. The digital images currently available, when georeferenced (even if there are slight distortions), provide a comprehensive framework in which to correlate the archaeological findings. This makes abundant new material open to comparison and further analysis.

The GIS platform

Our open GIS currently includes digital data from multiple sources combined into a geo-referenced platform. For the latter, the Universal Transverse Mercator (UTM) system has been adopted. The fuse 33N was assigned the Gauss-Boaga coordinates (the local standard in Italian cartography). Accordingly, the position of a point is represented by a pair of coordinates expressed in metres, Easting (X) and Northing (Y), with an estimated position error of 8 m. The Antaeus system currently performs data visualization and geo-referencing; network distribution of images and data; data exchange with other sources on

1 L. Bertacchi, *Nuova pianta di Aquileia* (Associazione Nazionale per Aquileia, Edizioni del Confine 2003).