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The Avkat Archaeological Project

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The Avkat Archaeological Project (AAP) focuses on the archaeology of the late Roman, Byzantine and Ottoman eras around the village of Beyözü (earlier Avkat), now identified as ancient Euchaita, as part of a historically-driven research project concerning the Turkish ilçe of Mecitözü in Çorum province, lying between the modern cities of Amasya and Çorum. During the summer of 2012, the project engaged in transforming the informatics system used during fieldwork into a condition to facilitate easier querying, analysis, curation and archiving. This included a migration of the project data – collected as two database systems – into a single overarching database allowing for the efficient storage of geospatial and tabular data; a cleaning of data to ensure full relational integrity; and a revision of the user interface to enhance querying and retrieval functions for project personnel.

During fieldwork, data for the AAP were collected implementing two databases. A client-server system was organised in MySql with a front-end user interface for data entry and querying coded in HTML and PHP. Within this database, the project stored field data observations collected via standardised paper forms. Geospatial information was managed via a geospatial database using ESRI's spatial database engine (ArcSDE), accessed in the field via a local geospatial server and served via the College of Charleston's group geospatial server following the completion of data collection. This component stored satellite imagery and spatial data tied to features and survey units.

During summer 2012, work began to integrate these two systems within a single database built in SQL Server 2008. SQL Server operates as a relational database management system (RDBMS) which natively stores tabular data. After installing the ArcSDE middleware, spatial data (i.e. attributes) could also be stored within the native tabular format thereby allowing both tabular and geospatial queries. At the time of writing, migration of the tabular data and its relational schema had been completed, with a full merging of geospatial components occurring in autumn 2012.

A plan of the final user interface was conceptualised, and implementation began in earnest. The system is designed to facilitate the querying of data via a search process focused upon survey unit (field or feature), artefact/ceramic vessel type, date or function; or geographically via the project's GIS via a map server using a Representational State Transfer (REST) service. Regardless of the query origin, results are displayed in a tabular form in a preformatted shortened query result (known as a view) and geographically within the adjacent map window. Further selection of individual results will provide a full description of the item of interest as recorded on project forms and related images. Users will be presented with the option of downloading query results in a variety of formats (.txt, .xlsx, .shp, .dbf, .jpg) to facilitate further analyses via other applications. Within the web mapping application, basic geospatial tools to allow for the measurement of distance and basic movement (pan, zoom in, zoom out and full extent) were added. Per user feedback, additional functionality can be designed as needed. The user interface is coded employing the ArcGIS Application Programming Interface (API) for JavaScript. The JavaScript API provides for customisation and the incorporation of code from libraries – not only the one provided by ESRI but also others such as jQuery, YUI and Dojo.

To date, data migration of tabular data into SQL Server, views and general layout components of the user interface (including the web mapping application) have been completed. Work in autumn 2012 will be focused upon a final merge of tabular and geospatial data into SQL Server and user interface refinements to allow for full functionality. Access to the system will be made to project personnel via a secure username/password, with full presentation to the academic community available coincident with final publication of the project results. Documentation of database schema and metadata is being stored concurrent with this phase of the project, facilitating long-term curation and storage via standard repository services (such as tDAR or ADS).

In addition to this work, further research on modelling landscape features related to the site of medieval Euchaita was undertaken and presented at the 2012 AIA conference. When considering Byzantine defensive systems of the sixth to 13th century, textual sources suggest a complex and integrated system of installations, ranging from large-scale *castra* to smaller, more ephemeral outpost locales. While larger installations have been identified in Turkey, Syria and elsewhere, traces of small late Roman/Byzantine defensive elements can be difficult to identify – even via intensive survey – owing to their scanty surface remains. Using refined survey methods developed by the Avkat Archaeological Project in combination with Byzantine texts and analysis in GIS, a range of defensive structures has been positively identified in the area around Euchaita. A method was presented by which smaller outposts were identified in the landscape. Intensive survey allowed the location of hill-top promontories with dense scatters of pottery and roof tiles. These promontories were noted to have a wide field of view. Deductive modelling within GIS incorporating geographical location and viewshed analysis were employed to determine whether the designation of these features as watchtowers was appropriate. The interpretation of these features as outposts is supported by the descriptions of defensive structures given in Byzantine military treatises and historical texts, archaeological evidence, GIS analysis and modelling. Furthermore, the process used to determine the likely functionality of these features in the landscape provides a means for developing interpretative frameworks for other elements in the ancient landscape.