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Testing the effectiveness of combining airborne remote sensing and ground geophysics for assessment of sand and gravel deposits and overlying archaeology.

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Our recently completed project (FASTRAC) has created an evidence base to demonstrate the advantages of integration of first-assessment ground investigations for both Mineral Assessment and Archaeological evaluation, using a combination of rapid survey methods. Developing technology is producing novel, precise, densely sampled data through airborne survey (notably LIDAR and hyper-spectral methods) and ground-based follow-up using a multi-sensor geophysical survey platform.

The advantage of this approach is the ability to cover large areas and assess the different data sets rapidly, providing information early in the development cycle to mitigate the impact of mineral extraction on the historic environment. Furthermore, the detailed early assessment of a site allows issues such as geodiversity, habitat, and maintenance of soil function, flood risk, and groundwater resource, to be addressed in the interests of both planning authority and developer.

Two sites in the Trent valley, UK, have been used as case studies. Each has a combination of sand and gravel mineral resource and archaeological remains which have been proved by conventional direct sampling. Lidar, hyperspectral imaging and multisensor surface geophysics were acquired and added to a GIS database. All available existing data sources such as surface mapping, topography, geology, conventional aerial photography, and direct sampling have also been compiled into the database.

An overview of the data compilation will be presented. The main discussion will centre on contrasting some of the insights provided by the combination of densely sampled remote sensing and geophysical data, in comparison to what might be revealed by a more conventional assessment, and to the established features of each site.

The initial data collection, processing and collation of an extensive data set as documented in this project represents a considerable investment of effort in the early stages of site assessment. The return is demonstrated in terms of the risk reduction for decisions about development of the resources concerned. Such risks cover the range of issues from resource sterilization, inappropriate mineral extraction, environmental damage and loss of heritage.