

High time for GIS

Following the implementation of a corporate Geographic Information System at one London borough, James Nolan outlines some of the benefits for its planning teams

At 10 32 PM on Tuesday 17th August 1915, Zeppelin L.10 passed over the lower Lee Valley in north east London and, in just 11 minutes, dropped an arc of bombs over a distance of three and half miles. Homes were destroyed and severe damage was caused to a church, roads and a tram depot.

A century later, early on a mid-winter morning, a light aircraft made an unnoticed pass over the same suburbs of Waltham Forest. This time, the target was to accurately capture geographical data using a high-powered laser scanner (LiDAR) and thermal image cameras.

Today, and following Waltham Forest Council's installation of an online corporate GIS, maps from the era of the first air raid and the most recent digital spatial data are used throughout the planning department.

Addressing change

Historic maps when compared with recent digital data shed light on past building use and this aids a range of professionals in their daily work. Along with planning policy, application areas include environmental protection, building controls, and housing enforcement.

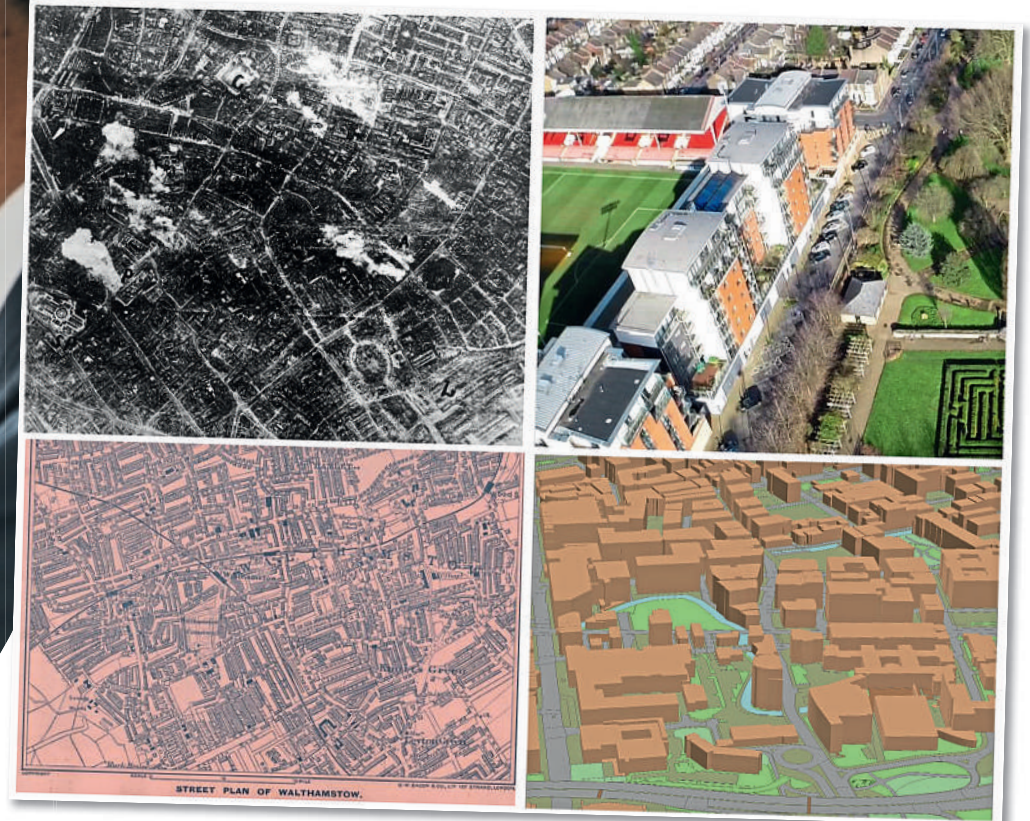
Public sector bodies have access to the best government digital addressing and mapping datasets available. When these are loaded into the GIS it allows effective spatial analysis, identifying change and evaluating future planning opportunities. This is achieved with searchable detailed geographical raster map images and vector overlays. Planners can accurately pin-point sites of concern and evaluate change over time. Also, within the GIS are remotely-sensed images, again searchable using the

same detailed address gazetteer.

Beneath the surface

Changes in buildings and infrastructure in the same location are recorded in historical maps. These maps, when overlaid with current information and proposed future building developments provide insight to potential issues. Prior existence of waterways, ponds, wells, tunnels and bomb damage can all cause issues when digging foundations. Land contaminates from past industrial sites can also be checked from previous building use. Much of this data is derived from maps by comparing original and subsequent building footprints. The online GIS software allows policy specialists and planners to see and share this data to make informed decisions.

Wider GIS functionality and data



Top left: 1917 aerial photograph of a German bombing raid over London, and right, a contemporary oblique aerial image of Waltham Forest with Leyton Orient football ground pictured centre left. Lower left: 1910 pocket street guide of Walthamstow compiled by G. W. Bacon & Co. Ltd. Lower right: Contemporary Ordnance Survey MasterMap Topography Layer gives users access to information on the heights of buildings

processing capabilities are required prior to publishing to the userbase. Spatial data is tested for coordinate reference systems and formats. They are then linked to relevant attributes and clipped to the region; this provides usable, relevant information for the remote online system users. Some government departments provide GIS format data for the whole country, (The Environment Agency for flood risk areas and DEFRA for noise levels on road and rail.) These data sets are clipped with a buffer as both sources indicate threats emanating from beyond the borough boundary. Once loaded, colour classification and transparencies are applied to highlight these layers.

Spotting heights

The preparation of raster data is also required prior to loading to make use of the available attribute data. Advanced processing tools create visual overlays from the data captured by the Remote Sensors. This in turn can provide, in effect, the most recent map layers of the municipality. The extrapolated data then provides a georeferenced visualisation of topology via a Digital Terrain Model (DTM) and a 3D image via a Digital Surface Model (DSM). This generated surface shows outlines of residential and commercial buildings.

Adding heights to buildings from the Ordnance Survey mapping data products provides a central place to visualise and compare structures, but only where the structure is surveyed. One approach of identifying building heights for none surveyed structures includes combining DSM raster height data with cadastral boundaries. These boundaries provide an indicative extent of a registered property, not the structure itself. It is, however, possible to capture the height of a structure within the boundary, where currently none is recorded. This derived vector file can be plotted and extracted as a list for prioritisation. This process also identifies existing built extensions and outhouses, which are further filtered using OS building outlines with enhanced 3D visualisation.

A 20:20 vision

Initiatives such as the Geovation Centre and the Geospatial Commission - which promote the use of government data to aid property management and development - are also of clear significance in local government planning. While many commercial property GIS applications are used to direct resources, mitigate risk and maximise profit, Local government planners have responsibility for buildings and land assets - and need to create places to live and work that add to the quality of life of residents.

To achieve these ongoing goals there is a need for a long-term view of GIS installations to support the roles of a wide user base. Considerations should include a flexible, scalable system - for users with only infrequent search requirements, for those who manage and edit geospatial data, and those more expert, running spatial queries. An easy-to-access system with an intuitive user interface and scalable toolset - coupled with robust data governance - will ensure that a corporate GIS within a public sector organisation is sure to stand the test of time.

James Nolan is the GIS Officer at the London Borough of Waltham Forest (<https://www.walthamforest.gov.uk/>)



Raster and vector mapping informs a wide range of Council initiatives and policies