Production soars following implementation of GPS in map revision

A massive 42% in productivity gains has been measured by Great Britain's national mapping agency, Ordnance Survey, following the implementation of Leica GPS surveying systems to undertake their most detailed mapping. GPS was introduced to the field from January 2002 and allowed all Ordnance Survey surveyors to update map data on the spot.

Every year, Ordnance Survey produces a wide range of digital data business products, along with millions of paper maps. They are responsible for updating and maintaining definitive map data for the whole of Great Britain, which is contained in a large computer database. This vast electronic map covers the whole of Great Britain and is so detailed that it includes the shape of every individual building, the precise alignment of roads and pavements and the exact location of public telephone boxes.

Its latest innovation is the creation of the multi-layered OS MasterMap – an even more sophisticated version of its most detailed data, in which more than 400 million natural and man-made features are held as self-contained polygons, all with unique codes so that third-party data can be associated with them quickly and easily.

The total Ordnance Survey workforce includes more than 350 surveyors who constantly measure and record the changing British landscape from a network of offices stretching from Inverness to Truro. Previously, the maintenance and updating of this massive amount of data proved an arduous and time-consuming task. Following a strategic partnership with Leica Geosystems at the end of 2001, Ordnance Survey began the 'GPS Deployment Project', which aimed to adopt GPS as the basis for field revision. GPS positioning was to replace where possible and economic the traditional terrestrial methods used to position new detail.

"Following a pilot project, it was anticipated that there would be significant efficiencies through implementing RTK GPS technology to data collection and management," Paul Cruddace, Geodetic Adviser at Ordnance Survey said. "These could be achieved through reduced backlog, increased production output or better currency of the data. The prediction was an increase in the production rate in the range of 25%."

Equipped with a backpack containing the RF530 RTK receiver, and carrying a hand-held pen com-puter running data collection software, the surveyor is ready to map an area. To obtain a precise position, the surveyor can communicate directly with a local base station (of which there are over 60 throughout Britain), or create a temporary base station from a receiver connected to their car. By positioning the receiver pole alongside the feature to be surveyed, the position of the new detail appears on the screen of the pen computer. The computer contains the digital mapping data that is to be updated, and the surveyor is able to add or edit a feature on the touch-sensitive screen.

At the end of the day, all the new information is sent electronically to a giant master database held on a central computer at the Ordnance Survey's headquarters in Southampton. Remote or inaccessible points can be defined with a Leica DISTO™ or a Leica TCR 307 Reflectorless Total Station. An intensive programme of aerial photography, particularly in rural areas, also supplements data gathered by ground staff.

Not only did the GPS method prove to be highly productive, the task became much easier and more efficient – allowing a single person to measure points and to check the data directly on the hand-held computer.

The actual increase in production, however, proved to be much better than expected. "For example, closer analysis of the production monitor used at Ordnance Survey showed that the difference between the production rates at the commencement of the project in December 2001 and the closure of the project in March 2003, was a massive 42.8% increase. These improved results were a combination of using the RTK GPS, allied to substantial redesign of the operating procedures and production processes used by the surveyors, Paul Cruddace said.

A tremendous achievement

"The GPS Deployment Project has been judged to be a tremendous success by all those connected with it – through the successful delivery of the project objectives, the effective support delivered through our partnership with Leica, and the commitment and innovation shown by our surveyors," said Ordnance Survey's Director of Data Collection and Management, Neil Ackroyd. "It has allowed us to realise efficiencies in our business that can be used to manage costs and re-invest in the capture of new types of information to further improve our customer proposition."

Unlike the old paper maps, Ordnance Survey's electronic map data can be kept up-to-date constantly – with around 5,000 changes made every day! Extracts of the latest 'edition' can be accessed instantly by the public through a national network of computer-linked retail outlets in the Ordnance Survey Options network, while updates to OS MasterMap data can be served online.

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