LANDSCOPE ENGINEERING

USING THE AUTOMAP SERVICE AND ORBIT MOBILE MAPPING TECHNOLOGY TO MAP THE TT AND SOUTHERN 100 ROUTES.

The Isle of Man Tourist Trophy, the annual motorcycle race, has certainly placed the Isle of Man firmly on the map offering one of the most challenging and exhilarating events on the international racing calendar.

Therefore, when LandScope Engineering was commissioned by the Isle of Man Government to accurately map both the TT and Southern 100 routes for the purposes of highway asset inventory and visualisation and to meet future 3D gaming and simulation requirements, a compelling and innovative solution was required.

The autoMAP mobile mapping system captures geo-referenced high density LiDAR point cloud and high resolution 360° panoramic imagery both rapidly and simultaneously from a vehicle travelling at normal highway speed. Hence, a single autoMAP data acquisition campaign provides an exceptionally rich data-set, enabling multi discipline access to the mobile mapping content which clearly lends itself to satisfy the full project requirements in an efficient and cost effective way.

Challenging Environment

The very nature of the tree lined section of the TT route put demands on the GNSS feed and hence the positioning accuracy of the trajectory. However, LandScope was able to obtain good accuracies and geo-referencing through the use of the systems dual frequency GNSS augmented with the Honeywell inertia navigation system and odometer sensors providing the best available vehicle trajectory positioning and pose accuracy.

To further constrain and ensure the highest order of achievable accuracies throughout the model, LandScope Engineering installed ground control points. This involved high accuracy coordination of unambiguous hard topographical detail (e.g. corners of road markings, gullies etc..) to allow constraining and verification of the LiDAR point cloud.

Highways Inventory

LandScope was initially commissioned by the Isle of Man government to create a highway drainage asset inventory with individual feature snapshots, attribution and metadata. This was completed using Orbit Asset Inventory through a simple "point, click and map" technique from the 3D environment (panoramas and / or point cloud). An accurate geo-referenced data holding was created to determine what highway drainage assets they have, where they are located and what condition they are in, contributing to the development of effective maintenance planning and strategic maintenance programmes.

Without quality data that is fit for purpose, Councils find themselves unable to develop robust strategies lacking sufficiently detailed evidence for funding or to achieve a high banding through the Department of Transport's (DfT's) Maintenance Capital Funding Self-Assessment.

When serving this inventory together with the mobile mapping data within an Orbit environment, the user community is able to inherently link:

- asset spatial dimension i.e. where the assets are and their proximity to other features and other assets;
- asset geospatial intelligence through from the 3D measurement domain; and



Back view on TT track using spherical image and measuring the lane width.



LandScope's mapping car ready to map the curcy roads of the Isle of Man.

• assessment and evaluation capabilities through the visualisation similar to 'Google StreetView'.

More than ever, highway asset management requires increasingly detailed asset data. Highway Managers are seeking ways of visualisation, capture, analysis, sharing and modelling and this is where LandScope Engineering and Orbit Technologies are certainly adding value to this process.

Although the original requirement for the Isle of Man Government was the production of a highways drainage inventory, this innovative approach brings benefits in that one campaign may satisfy many different objectives namely:

- Scalable highway asset inventory, to include other feature such as street furniture, street lighting etc, providing detailed and configurable asset information for use in spatially enabled / mapping / GIS software.
- Point cloud dataset to facilitate planning and highway engineering functions.
- Simulation, gaming and 3D modelling, just because, it's the TT after all......



LiDAR view of a dangerous turn using Orbit MM Feature Extraction

Technology for Visualisation

Creating a reality based model with the ability to add visualisation was a key requirement for the Isle of Man Government. The use of Orbit GT Software in-house provides the platform for instant access to high definition, geospatially referenced digital 3D panoramic images and point cloud in an intuitive interface.

Bringing the outside in unlocks the potential for efficient site viewing, verification, validation, measurement and design, without the need to visit site.

The ability to serve the mobile mapping data across platforms and departments enables user access to the Orbit measurement / data acquisition interface. The user community can interpret the panoramic imagery using standard GI tools for zooming in and out, panning around etc and engage in a 'virtual walk' through the entire TT and Southern 100 routes.

Simulation for the Latest Generation Gaming Development

Due to the accuracies achieved constraining the mobile mapping data to the targeted control campaign, LandScope are now working with a racing games company, commissioned by the Isle of Man Government, to reproduce this iconic track environment with high end visual representations.

About the author

Sarah Jones is the GIS Manager for LandScope Engineering where she is involved in the autoMAP Mobile Mapping Service mainly working with Topcon and Orbit Geospatial Technologies.

Having previously worked for over 10 years in GIS in Local Government, Sarah was involved in corporate GIS and Land and Property Systems. Sarah was lead officer for a number of E-Government integration projects and had overall responsibility for the infrastructure, development and implementation of location based systems.

More recently in her current role, Sarah is responsible for managing a wide spectrum of autoMAP mobile mapping projects and deliverables through the use of innovative tools and techniques. Last year, Sarah was a speaker at a number of conferences, showcasing how mobile mapping plays its part in efficient highways management.

Sarah is a Fellow of the Royal Geographical Society, with a first class BSc honours degree in Geography and Computing.



ABOUT LANDSCOPE ENGINEERING

LandScope Engineering provides an integrated survey and data management service to the engineering, built infrastructure and environmental sectors. Employing a multi-disciplinary approach, we are able to channel extensive geospatial and geophysical data acquisition and management experience in to the highest quality deliverable for our customers.

A strong core geomatics competency enables our customers to derive maximum value from a range of established application technologies. We aim to simplify the process of obtaining and managing critical data throughout the life-cycle of our customers' projects. The planning, management and performance of projects has served to demonstrate that quality of service is inextricably linked to measures taken to safeguard the integrity of and maximise the value of data. It is on this premise that the development of LandScope has been based. LandScope has aligned itself with various established quality providers to ensure that the best technical support, latest technology and adequate resources are built in to the service.

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