

Optimised TIN Models

Enabling a wide variety of applications that present our world in three dimensions to provide powerful and practical 3D visualizations

A Picture is Worth (Many More Than) a Thousand Words

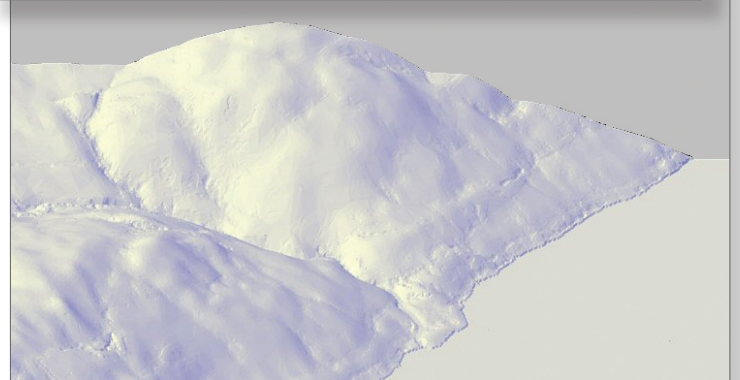
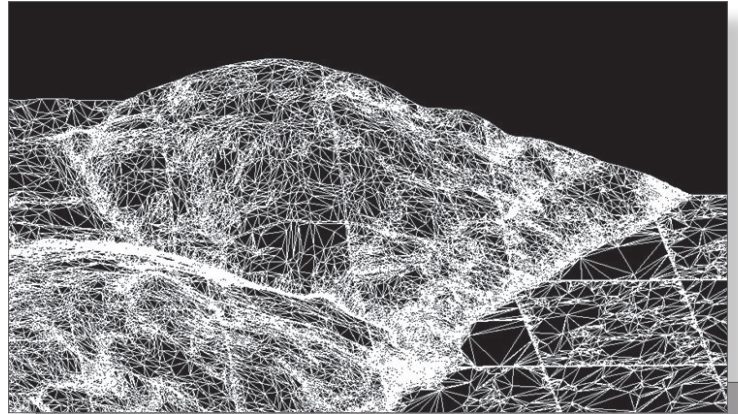
Triangulated irregular networks (TINs) are vector-based layers or surfaces comprised of nodes and lines with coordinates in three dimensions (x, y, and z) that are arranged in a mosaic of triangles. Derived from the comprehensive data contained in Intermap's digital elevation models (DEMs), the points of an optimised TIN model (OTM) are distributed based on calculations that determine which points are necessary to accurately represent the terrain. This process results in a data file that's much smaller in size than a raw TIN, and accurately portrays elevation information in three dimensions.

An OTM includes points that capture significant variations in topography, including summits, valleys, ridges, water features, and more. OTMs provide an opportunity to use elevation data in diverse ways.

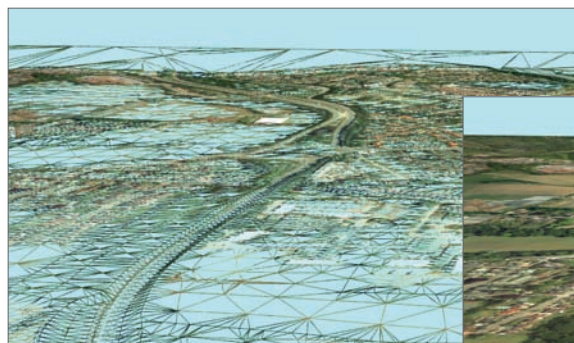
Intermap Technology's OTM product is derived from digital terrain models (DTMs), the bare-earth DEM produced as part of the company's NEXTMap® countrywide 3D mapping program. NEXTMap DTMs feature 5-meter postings or cells with a vertical accuracy specification of 1 meter RMSE.

OTMs preserve the useful detail contained within the NEXTMap DTM data in a simple format that still provides an extremely high degree of functionality. In the optimisation process, each tile of data is analysed to determine the most efficient way to represent the terrain.

For water bodies and areas of flat terrain, the raw TIN data is greatly optimised, while areas of high relief are optimised in a way that reduces the number of triangles but maintains the topography of the terrain. This process results in OTMs that, while reduced in size from the original TIN, still depict the elevation aspects of the ground in a manner suitable for a wide range of applications.



Intermap's OTMs (top) are derived from our precise digital terrain models (bottom), which have a vertical accuracy specification of 1 meter RMSE.



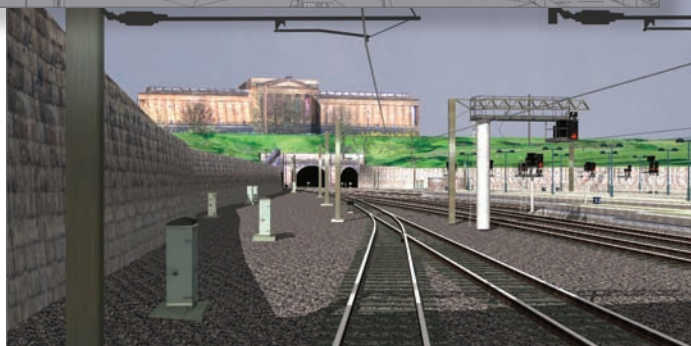
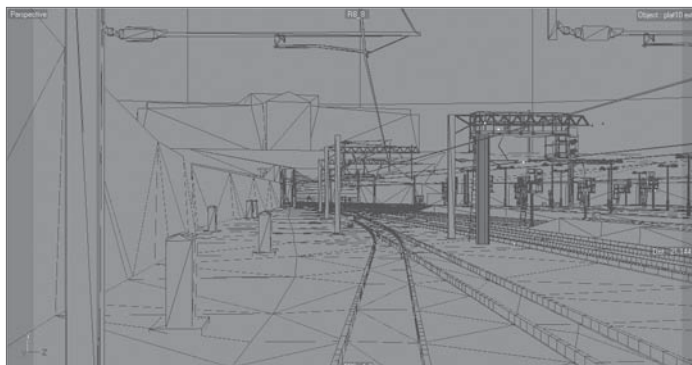
An OTM (above) is combined with other imagery to create a high-resolution city rendering (right).



Real-world Applications in a Virtual Environment

A 3D visualisation can be easily created simply by rendering the triangular facets within a TIN, and, as an underlying dataset, OTMs can be combined with other layers and imagery to create powerful and useful visualisations. Applications that can take advantage of the visualisation power of OTMs include:

- **Landscape modelling:** underlying terrain provides a landform's shape; 3D visualisation shows how potential structures will look and interact with the landscape before a single shovel is lifted.
- **Engineering and design:** the structural efficiency and visual appeal of buildings and other infrastructure are affected in many ways by the landforms or topography upon which they are built.
- **Architectural visuals:** during all phases of the design / development process, 3D visuals can provide progressively updated information about a project's final appearance.
- **Computer games:** entertainment and educational software can be programmed with terrain characteristics accurately based on real topography.
- **SAT/Nav and PND/PDA:** the smaller file size of OTMs makes them ideal for use on portable devices when visualisation applications still demand a high degree of accuracy.
- **Military applications:** strategic and tactical manoeuvres can be visualised and simulated on virtual topography based directly on real-life terrain data.



The TIN model at top was combined with other imagery data to compile the rendering of a railway in the design phase. This particular imagery was used to ensure that drivers could see critical signaling along the proposed route.

Independent Verification and Validation

In order to ensure the utmost accuracy of its products, including optimised TIN models, Intermap created the Independent Verification and Validation (IV&V) department, a unit within the company that examines procedures and data to verify that all of our elevation models and other data are as accurate as possible. The department resides in a separate division from the group responsible for producing our products, giving it managerial and operational independence. This provides IV&V with true objectivity, allowing it to serve a checks-and-balances role within the organisation that goes beyond internal quality control procedures.

For additional information regarding Intermap's OTMs in the United Kingdom, which are available now, call Mark Stanley at +44 (0)1491671933 or e-mail mstanley@intermap.com. For questions regarding the availability of OTMs in the United States and elsewhere, call Larry Starling at 303-708-0955 or e-mail lstarling@intermap.com.

Images courtesy Getmapping PLC and G-VR Limited, United Kingdom.