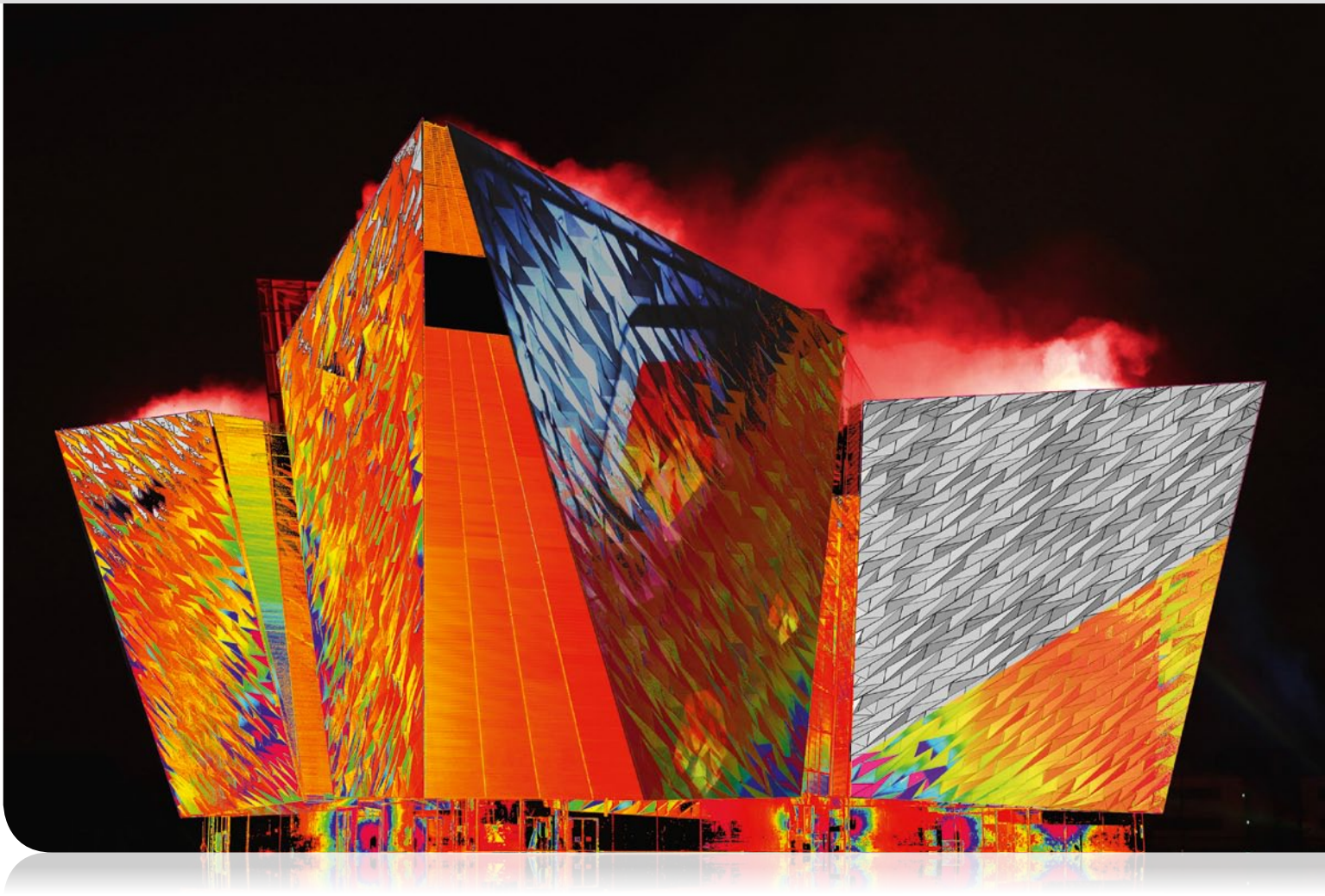

Light Show for Titanic Belfast

by Mark Hudson

The Titanic was making headlines in April as Belfast marked the 100th anniversary of the ship's sinking. Coastway, a chartered geospatial engineering company based in Co Kildare, Ireland, was retained by UK interactive arts and technology collective, "seeper", to produce a 3D model of Belfast city's newest tourist attraction, Titanic Belfast.

Titanic Belfast is a 14,000 m² (16,700 yd²) state-of-the-art visitor center telling the story of RMS Titanic from its conception to the ship's tragic maiden voyage. The Belfast City Council and The Northern Ireland Tourist Board organized a festival to commemorate the Titanic story. The highlight of the Titanic Belfast Opening Festival was a spectacular 3D motion graphics and pyrotechnics light show produced by seeper. It was for this light show that seeper required Coastway to provide them with a highly accurate 3D Model of Titanic Belfast to enable them to plan, design, and execute a fully immersive light show using 3D projection mapping onto the building façade.

The Challenge

Whilst Coastway has significant experience in producing 3D Models of façades using High-Definition Laser Scanning technology, the unique architectural design of the Titanic Belfast building presented them

More than 3,000 irregular façade panels of the visitor center were scanned for the light show.

with a number of challenges during the laser scanning and modeling process due to its asymmetrical structure and use of specialized façade materials: The building façade is comprised of over 3,000 irregular anodized aluminum satin finished panels.

Coastway's Solution

Following a detailed study of the building, Coastway proposed using laser scanning to produce a 3D model and then transferring it to seeper's required Cinema 4D format. Coastway used the Leica HDS6200 3D laser scanner to survey the exterior face structure of the Titanic Belfast building. The survey was performed using a 2 m (6.6 ft) tripod and elevated platforms and by scanning from the roofs of the protruding hull structures. The survey was completed in three days on-site with a further three days to register the collected laser scan data and geo-reference the resulting point cloud to Irish National Grid Co-ordinates.

Coastway were required to achieve accuracies of ±10 mm (0.39 in) with the final model. The Leica HDS6200 quoted accuracy of 2 mm (0.078 in) on a modeled surface when combined with survey control accuracy of ±2 mm (0.078 in) enabled us to achieve and exceed the desired accuracy. To further ensure the accuracy of the 3D Model, Coastway collaborated with EDM Spanwall to verify each panel against the fabrication dimensions.

The full 3D model of the building façade took three weeks to produce. Each of the 3,000+ irregular panels had to be individually modeled in Leica CloudWorx for AutoCAD plug-in and in additional modeling software.

The Titanic

Built in Belfast, Nothern Ireland, the RMS Titanic passenger liner was the second of three Olympic-class ocean liners – the others were the RMS Olympic and the HMHS Britannic (originally named Gigantic). They were by far the largest vessels of the British White Star Line's fleet, comprised of 29 steamers and tenders in 1912.

The ships were constructed by Belfast shipbuilders Harland and Wolff, who had a long-established relationship with the White Star Line dating back to 1867.

The RMS Titanic sank in the North Atlantic Ocean on 15 April 1912 after colliding with an iceberg during her maiden voyage from Southampton to New York City.

The sinking of the Titanic caused the deaths of 1,514 people in one of the deadliest peacetime maritime disasters in history. She was the largest ship afloat at the time of her maiden voyage.

Source: Wikipedia

The complicated building façade and highly reflective surface of the anodized aluminum satin finished panels created problems for ensuring a complete return of laser scan survey data. Return signals to the Leica HDS6200 were just about at their limit at a range of 79 m (259 ft) from the instrument set up to the very top of the building. Access to top of the building was limited but Coastway had to ensure they could capture any remaining areas that could not be surveyed from the ground. Coastway would certainly consider using the Leica ScanStation C10 laser scanner on future similar projects, where the extended range would enable a larger proportion of laser scan data to be captured from the ground stations.

The completed façade model was saved as a Cinema 4D format for seeper to use for the production of their light and pyrotechnics shows.

The Titanic Belfast Light Show was held on 5 April 2012 and was watched by an estimated 60,000 people. The show consisted of projection mapping onto different sides of the building simultaneously combining pyrotechnics, fireworks, and soundtrack to tell the story of the Titanic. ■

About the author:
Mark Hudson is recognized as a leading global geospatial engineer, with over three decades of experience in some of the world's major civil engineering, construction, and tunneling projects. He is a Director of Coastway Ltd, Managing Director of Subsurface Laser Scanning Ltd, and Director of Irish Legal Mapping Ltd..
markhudson@coastway.net