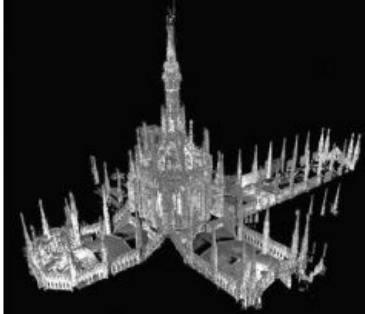# Milan Cathedral Restoration Goes Hi-tech

A highly accurate, 3D model is to support restoration work at the world's fourth largest church Duomo di Milano or Milan Cathedral in Italy. Millions of laser-scanned measurements were combined with other survey data and photogrammetric images allowing researchers from the Politecnico di Milano to generate both 2D and 3D visualisations, classical plans and elevations, as well as computer-generated animations. The main aim of the project was to obtain an understanding of the state of the spire in order to support restoration operations ahead of an International Expo due to take place in 2015.

The researchers are using Pointools software. Course leader Ing. Francesco Fassi says that it enables them to visualise a vast number of points, take distance measurements, extract co-ordinates and attach notes and links to other models. Thanks to these relatively simple operations and the power behind the Pointools package a point cloud model can be a usable and useful virtual model in a matter of minutes.

With a project undertaken by the 3D Survey Group at the Politecnico di Milano and supported by the Veneranda Fabbrica (the authorities that manage all ordinary and extraordinary works at the Cathedral) 1.5 billion points of laser scanned data were combined with data from more traditional topographic and architectural survey techniques. More than 600 georeferenced photographs, including some of the dome cladding captured by a UAV (unmanned aerial vehicle) helicopter, were also used to create a highly accurate 3D model from which section profiles could be extracted.

Pointools point cloud modelling software was used to combine the different data sources and create the model and real world visualisations including fly through movies. Using the Pointools plug in for Rhino the accuracy of the model could be checked and different project scenarios designed and modelled.

The survey and modelling of Milan Cathedral forms part of a wider research project to investigate the integration of traditional and innovative technologies for survey and modelling of cultural heritage using Pointools software. This research, undertaken by the 3D Survey Group at the Politecnico di Milano (Director Prof. Carlo Monti) also includes studies of the Torre Velasca (Velasca Tower), St. Marcus Basilica (Venice), ancient Aqueduct Claudio (Roma), archaeological site Diana Temple in Nemi (Roma), St. Andrea Basilica in Mantova, the Fortified Town of Sabbioneta (UNESCO Heritage), IES refinery in Mantova (MOL Group).

https://www.gim-international.com/content/article/milan-cathedral-restoration-goes-hi-tech